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PRELIMINARY

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S/360 TELOR3 PROGRAM DESCRIPTION TEST, EDIT, AND LIST AN ORB3A TAPE

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Robert K. Schlessinger
Computer Sciences Corporation

July 1971

GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland

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S/360 TELOR3 PROGRAM DESCRIPTION

TEST, EDIT, AND LIST AN ORB3A TAPE

Prepared by

COMPUTER SCIENCES CORPORATION

for

GODDARD SPACE FLIGHT CENTER

Under

Contract No. NAS 5-11790

Task Assignment No. 72 Subtask H

FOREWORD

The Test, Edit, and List ORB3A Tape program (TELOR3), was prepared by Computer Sciences Corporation under Contract Number NAS 5-11790. It is a completely revised version of the Test, Edit, and List ORB3A Tape program produced by International Business Machines Corporation in March 1969, under Contract Number NAS 5-10022.

The present document supersedes the original.

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Contract Number NAS 5-11790

ABSTRACT

This report documents the S/360 TELOR3 Program which tests, edits, and lists the information on an ORB3A tape. The documentation includes narrative descriptions (including flowcharts) of the main driver routine and the subroutines of the TELOR3 Program, a User's Guide, cross reference charts pertaining to the source program, and a compiled listing of the source program.

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SECTION 1

INTRODUCTION

The purpose of the TELOR3 Program (Test, Edit, and List ORB3A Tape) is to validate and/or edit the single precision floating point data on a 7-track, binary ORB3A tape (see Reference 1). To accomplish this purpose TELOR3 provides the five options which are listed below:

1. Ascending Node Report Option - Processing in this option lists the times of ascending node crossing numbers (pass numbers) present on an input, binary ORB3A tape and computes and lists the time period between successive pass numbers (ascending nodes).

2. Change Pass Numbers and Report Option - Processing in this option creates an output,binary ORB3A tape identical to the input,binary ORB3A tape, except that the output ORB3A tape contains altered pass numbers (altered ascending node crossing numbers). This option also produces an ascending node report based on the output ORB3A tape.

3. Select Time Period Option - Processing in this option selects a user specified period of data present on the input, binary ORB3A tape and writes this period on an output, binary ORB3A tape, together with a revised title record containing the start and end times of the selected period.

4. Sunlight Report Option - Processing in this option lists the times of satellite entrance into and exit from sunlight present on an input, binary ORB3A tape.

5. Check Record Option - This option is used to check binary ORB3A tapes which experienced abnormal run termination when being generated. Certain words in each record of the input ORB3A tape are checked for absolute errors, such as, a percent value exceeding 100 percent. In addition, selected words are checked for errors peculiar to ORB3A data, such as, a word not being equal to a standard ORB3A value. Each record is also checked for a read error and for an end-of-file indicator. The first input ORB3A record to fail any one of the above checks while being processed in this option, causes an output binary ORB3A tape to be generated with the period of data extending through the next-to-the-last record before the check-fail record. In addition, the output ORB3A tape has a revised title record containing the new end time of the satellite data.

Only one option can be executed for any job submittal.

The S/360 TELOR3 Program has been compiled under FORTRAN IV, level H, optimization level of zero on the IBM 360/95 using Release 19.

The following sections of this report present detailed subroutine descriptions for the main driver routine and the processing subroutines which form the TELOR3 Program. Each description includes: (1) the purpose of the subroutine; (2) the method of the subroutine; (3) subroutine usage; (4) subprograms called; (5) a flowchart; and (6) subroutine restrictions.

In addition, this report contains three appendices which are described below:

Appendix A:	A User's Guide including a sample run printout for each of the five TELOR3 options.
Appendix B:	Source program cross reference charts displaying: (1) subroutine COMMON block usage; (2) input/output units vs internal statement numbers (ISN) for each subroutine; and (3) calls to subroutines vs ISN numbers for each subroutine.
Appendix C:	A compiled listing of the source program.

SECTION 2

SUBROUTINE DESCRIPTION -- MAIN DRIVER

Subroutine Name and Program Number MAIN, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

2.1 PURPOSE

MAIN serves as the executive or supervisory routine for four of the five options in the S/360 TELOR3 Program. The remaining option, specifically, the Change Pass Numbers and Report option, is performed by logic contained within MAIN.

2.2 METHOD

The MAIN routine first reads in the title record of the TELOR3 input tape and verifies whether or not the input is a binary ORB3A tape. If not, an error message is printed out, and execution is terminated. If the input is a binary ORB3A tape, MAIN reads an option card specifying the input ORB3A tape number and which one of the five possible TELOR3 options is to be performed. The five possible TELOR3 options are: the Ascending Node Report Option (subroutine ASCEND); the Change Pass Numbers and Report Option (MAIN routine); the Select Time Period Option (subroutine SELECT); the Sunlight Report Option (subroutine SUNLGT); and the Check Record Option (subroutine CHKREC). A validity check is made on the option selector read from the card. If the selector is invalid, an error message is printed out and execution is terminated. If the option selector is valid, processing continues and MAIN converts the input ORB3A tape start and end times in seconds-of-day (contained

in the title record), to start and end times in hours, minutes, and seconds. A title page is printed out displaying the program title (TELOR3), the option selected, satellite ID, input ORB3A tape number, and input ORB3A tape start and end times in hours, minutes, and seconds. MAIN is then ready to supervise the execution of the specific option chosen. The following paragraphs describe how MAIN controls the program flow for each of the five possible options.

If the Sunlight Report Option, the Select Time Period Option, or the Check Record Option has been specified, MAIN calls the appropriate subroutine. The desired processing is performed by the subroutine. Control is then returned to MAIN, and the program comes to a stop.

If the Ascending Node Report Option has been selected, MAIN prints out the column headings for this report option. MAIN then enters a loop which reads an input ORB3A tape record into an array called READIN, and checks the record to see whether it is a data record or a sentinel record.

When a data record is encountered, MAIN checks for the existance of an ascending node data item by examining the third word in the 12th data item (the special type data item) for the absence or presence of a 999. When 999 is absent, an ascending node data item exists in the data record. In this case, MAIN calls subroutine ASCEND to isolate that item and use it to produce and store one line of information for the BCD output of the Ascending Node Report. Program control is then returned to MAIN which executes instructions to print the ascending node line of information just stored by ASCEND. MAIN then returns to the beginning of the loop and another input record is read into array READIN.

If 999 is present in the 3rd word of the 12th data item, it indicates to MAIN that no ascending node item exists in this data record and MAIN returns to the beginning of the loop to process the next data record.

When a sentinel record is encountered, a message is printed on the Ascending Node Report stating that a normal termination of the Ascending Node Report Option has occurred.

If the Change Pass Numbers and Report Option has been selected, MAIN creates an output, binary ORB3A tape which is a duplicate of the input, binary ORB3A tape, with the exception that the output tape contains altered pass numbers (i.e., altered ascending node crossing numbers). The Pass Number Option also produces an ascending node report, based on the output ORB3A tape. The input option card read by MAIN supplies a number (stored in variable VALUE) which is one less than the desired value for the pass number of the first ascending node data item to be written on the output ORB3A tape. After the option card has been read, column headings for the Ascending Node Report based on the output ORB3A tape are printed out. Next, the TITLE array (containing the title record from the input ORB3A tape) is written out as the title record on the output ORB3A tape. MAIN then enters a loop which performs the following steps:

1. Reads an input ORB3A record into the READIN array.

2. Checks the record (array READIN) to determine whether it is a sentinel, or a data record.

3. If it is a sentinel record, a loop exit occurs, the proper number of sentinel type records are written on the output ORB3A tape, an end-of-file is written on the output ORB3A, and a message is

printed in the Ascending Node Report stating that a normal termination of the Change Pass Numbers and Report Option has occurred.

4. If it is a data record, the pass number of each satellite data item in the record (array READIN) is changed and the content of READIN is then written out on the output ORB3A tape.

5. If the record just written out contains an ascending node data item, subroutine ASCEND is called to produce and store one line of information for the output of the Ascending Node Report. Control then returns to MAIN which prints the line of information in the Ascending Node Report, and MAIN returns to the beginning of the loop.

6. If the record just written out does not contain an ascending node data item, MAIN returns to the beginning of the loop.

The pass numbers in Step 4 above are changed in the following way. Each data item in array READIN is examined for the presence of an ascending node type indicator and the pass number of every data item is replaced by the content of VALUE until an ascending node data item is encountered. When an ascending node data item is encountered, VALUE is incremented by one and the result replaces the pass number of the ascending node data item, and the pass numbers of all subsequent satellite data items in the READIN array, until another ascending node data item is encountered.

2.3 USAGE

This section presents information defining the interfaces of the Main Driver Routine (MAIN), of program TELOR3, with referenced external storage areas, and with other subprograms.

2.3.1 Calling Sequence

MAIN is the Main Driver Routine for program TELOR3 and, therefore has no associated calling sequence.

2.3.2 COMMON Areas

A single, unlabeled COMMON area is used in the TELOR3 Program. The statement defining this COMMON area is:

```
COMMON TITLE (256), READIN (256), PERIOD, ISAVE(6),
ISET
```

The arguments are defined in the following table:

Argument	Dimension	Description	
TITLE	256	Array containing an ORB3A title record.	
READIN	256	Array containing an ORB3A data record.	
PERIOD	1	Time interval between successive ascending nodes in minutes (set in subroutine ASCEND). The seventh data element in each line of the Ascending Node Report output.	
ISAVE	6	Array used to store six of the seven data elements comprising one line of the Ascending Node Report output (set in subroutine ASCEND).	
ISAVE(1)		Pass Number	
ISAVE(2)		Year-month-day	Pass Number time of occurrence
ISAVE(3)		Day-of-year	
ISAVE(4)		Hour-of-day	
ISAVE(5)		Minute-of-hour	
ISAVE(6)		Second-of-minute	

Argument	Dimension	Description
ISET	1	Flag parameter used in subroutine ASCEND to specify the equation to be used in calculating the time interval (PERIOD) between successive ascending nodes (set in MAIN) = 0; PERIOD=0, (for first ascending node encountered only) = 1; PERIOD=time elapsed from preceding ascending node encountered.

2.3.3 External Data Sets

Program TELOR3 interfaces with two external data sets:

1. The input, binary ORB3A tape for all options
2. The output, binary ORB3A tape for the following options:
   - Change pass numbers and report option
   - Select time period option
   - Check record option

These tapes are read or written, as appropriate by subroutine RWTAP4. Detailed description of the content and format of these tapes is included in the subroutine description for RWTAP4.

2.4 SUBPROGRAMS CALLED

This section identifies the subprograms (subroutines and functions) called from MAIN. The CALL statement for each call to each subprogram is given, followed by a definition of the calling sequence arguments. Where multiple calls to the same program are made from MAIN, the calls are presented in the order in which they appear in the source listing.

2.4.1 Subroutines Called

1. Subroutine ASCEND - This subroutine is called to isolate ascending node data items and store data for the Ascending Node Report. The calling sequence is:

   CALL ASCEND

   There are no arguments in the calling sequence.

2. Subroutine SUNLGT - This subroutine is called to isolate sunlight entrance or exit data items and report them. The calling sequence is:

   CALL SUNLGT

3. Subroutine SELECT - This subroutine is called to execute the Select Time Period Option.
   The calling sequence is:

   CALL SELECT

   There are no arguments in the calling sequence.

4. Subroutine CHKREC - This subroutine is called to execute the Check Record Option. The calling sequence is:

   CALL CHKREC

   There are no arguments in the calling sequence.

5. Subroutine RWTAP4 - This subroutine is called to read the input ORB3A tape or write the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 -	Called to read the input ORB3A tape
WTAPE4 -	Called to write title or data records on the output ORB3A tape.
WSNEOF-	Called to write sentinel records and an end-of-file on the output ORB3A tape.

The calling sequences used in MAIN are listed below:

```
CALL RTAPE4    (TITLE, IERR)
CALL WTAPE4    (TITLE)
CALL RTAPE4    (READIN, IERR)
CALL WTAPE4    (READIN)
CALL WSNEOF    (READIN, TITLE, IWORD)
```

The arguments appearing in these calling sequences are defined below:

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

- =0; No unusual conditions
- =1; End-of-file encountered
- =4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

IWORD: An indicator used to control branching in WSNEOF processing.

- =1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.
- =2; WSNEOF writes two sentinel records and an end-of-file on output ORB3A tape.

READIN: A 256 word array used to store each data record read from the input ORB3A tape; and data or sentinel item records ready to be written on the output ORB3A tape.

TITLE: A 256 word array used to store the title record read from the input ORB3A tape; and to store the title record and sentinel records ready to be written on the output ORB3A tape.

2.4.2 Functions Called

The routine MAIN calls the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in MAIN are:

FLOAT (IREAD1)

FLOAT (IREAD2)

FLOAT (IREAD3)

FLOAT (IREAD4)

The arguments appearing in these calling sequences are defined below:

IREAD1:	Start time hour for satellite data on the input ORB3A tape
IREAD2:	End time hour for satellite data on the input ORB3A tape
IREAD3:	Start time minute-of-hour for satellite data on the input ORB3A tape
IREAD4:	End time minute-of-hour for satellite data on the input ORB3A tape.

2.5 FLOWCHART

The flowchart for routine MAIN appears in Figure 1.

2.6 RESTRICTION

The routine MAIN can only process one option per job submittal.

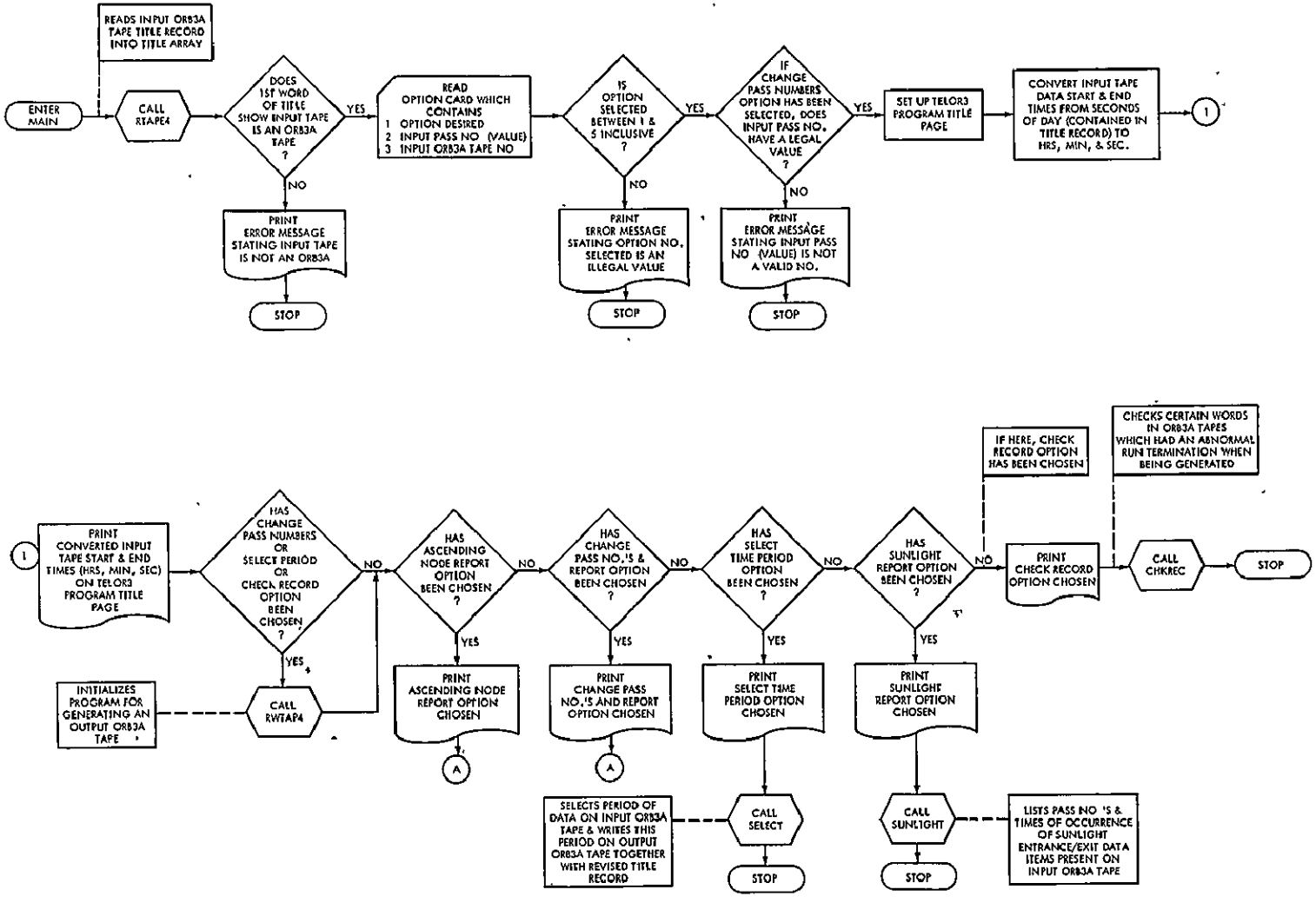


Figure 1 (sheet 1 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program

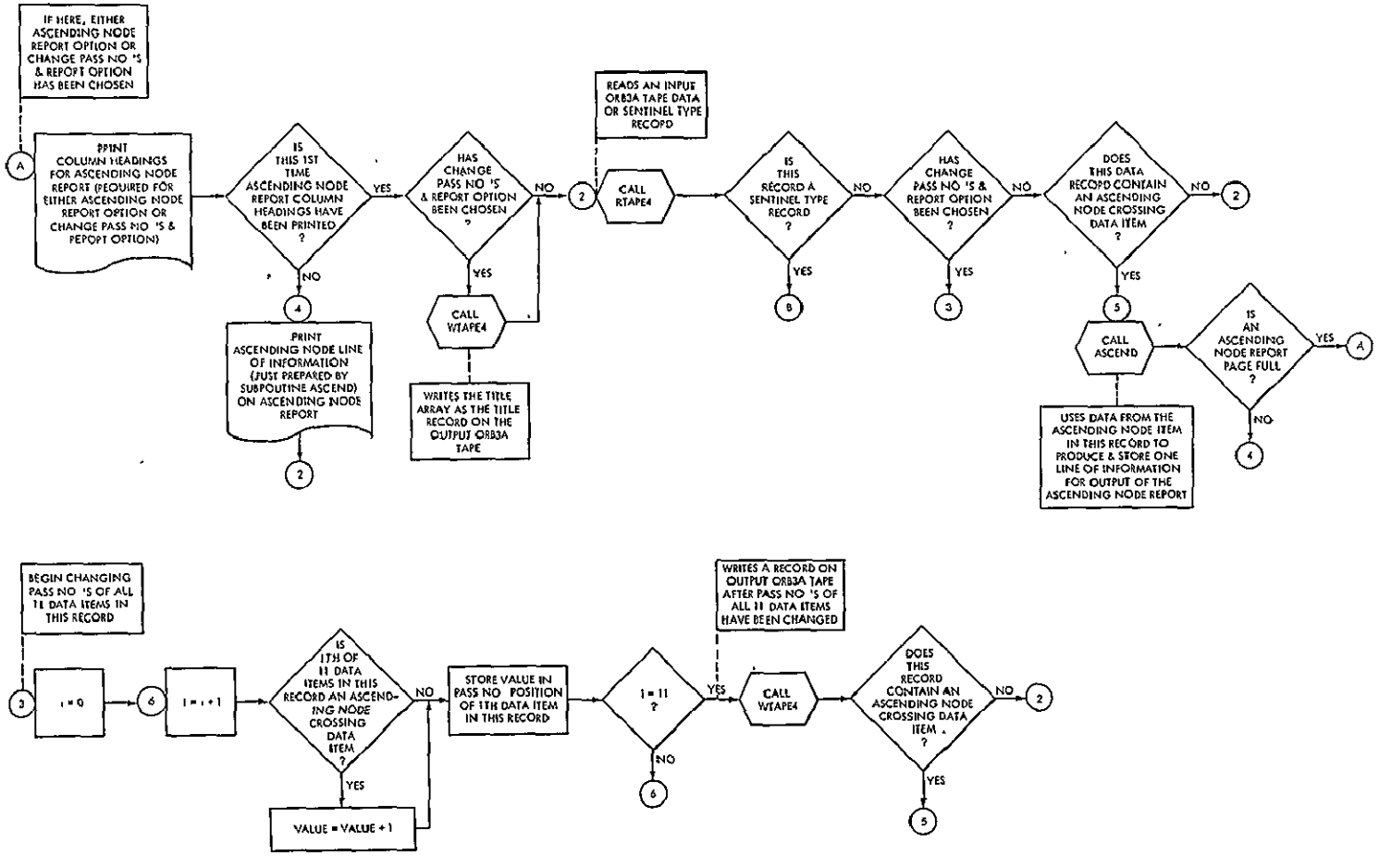


Figure 1 (sheet 2 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program

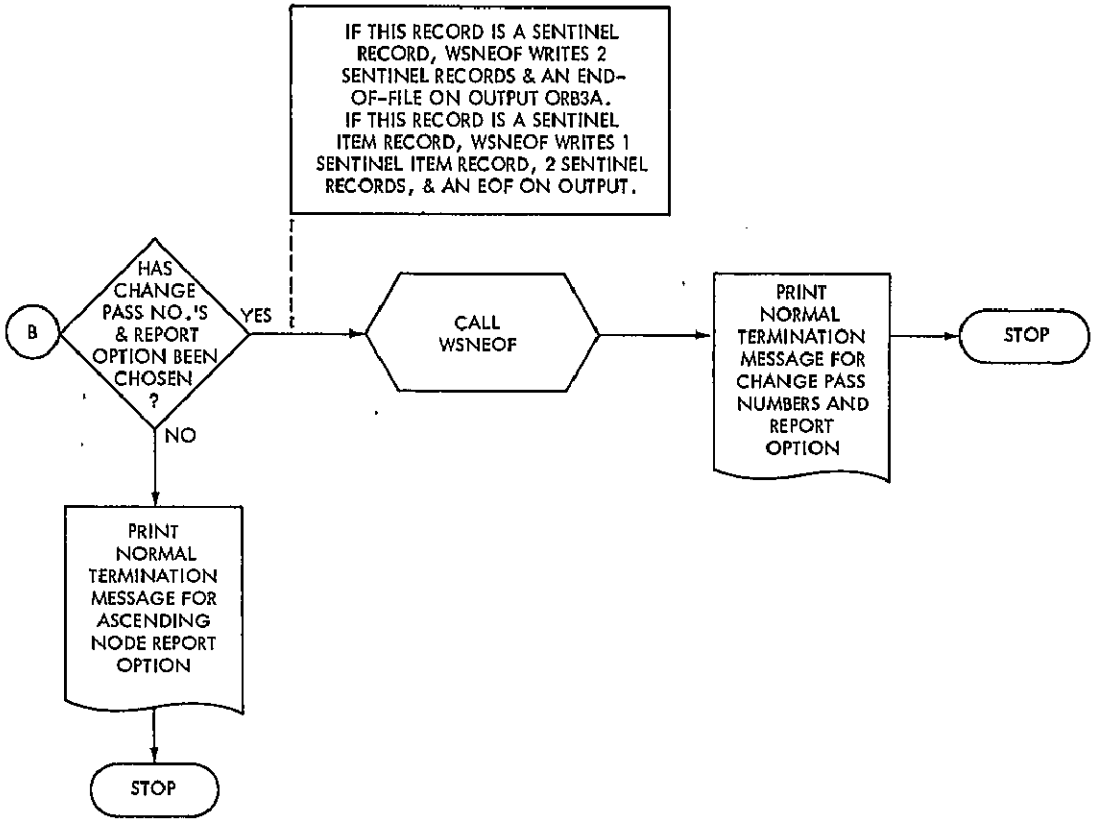


Figure 1 (sheet 3 of 3). Flowchart for MAIN Routine of the S/360 TELOR3 Program

SECTION 3

SUBROUTINE DESCRIPTION -- ISOLATE ASCENDING NODE (ASCEND)

Subroutine Name and Program Number ASCEND, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

3.1 PURPOSE

Subroutine ASCEND isolates the satellite data item in an ORB3A data record which is of the ascending node type, and uses data from this ascending node item to produce and store one line of information for the BCD output of the Ascending Node Report.

3.2 METHOD

Subroutine ASCEND isolates the data item in an ORB3A data record which is of the ascending node type. To accomplish this isolation, ASCEND examines the type indicator (first word) of each of the eleven satellite data items in the data record. The record is stored in the READIN array. When the first word of a data item contains a type indicator equal to 2, the ascending node data item has been found. The time of occurrence of this ascending node is converted from seconds-of-day to hours, minutes, and seconds. The pass number, the year-month-day of occurrence, day-of-year, and the converted time of the ascending node are then stored in an array called ISAVE. Finally, the period of time, in minutes, between this ascending node and the last previous ascending node, is calculated and stored in variable PERIOD. If this is the first ascending node to be found, PERIOD is set to zero. ISAVE and PERIOD then contain the necessary data for one line of information for the output Ascending Node Report. Control is returned to MAIN in which instructions are executed to print this line of information.

3.3 USAGE

This section presents information defining the interfaces of subroutine ASCEND with referenced external storage areas, and other subprograms.

3.3.1 Calling Sequence

The calling sequence is:

```
CALL ASCEND
```

There are no arguments in the calling sequence.

3.3.2 COMMON Areas

Subroutine ASCEND makes use of information stored in the unlabeled COMMON area used in Program TELOR3. This COMMON area is defined in the subroutine description for the routine, MAIN (Section 2.3.2).

3.3.3 External Data Sets

None

3.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from ASCEND. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

3.4.1 Subroutines Called

None

3.4.2 Functions Called

Subroutine ASCEND make use of two IBM system functions: FLOAT and MOD.

1. Function FLOAT (IVAR) - This function is used to convert the integer argument variable (represented by IVAR) to a real variable without round off. The calling sequences appearing in ASCEND are:

   FLOAT (ISAVE(4))

   FLOAT (ISAVE(5))

   The arguments appearing in these calling sequences are defined below:

   ISAVE(4): Hour-of-day in which an ascending node occurs

   ISAVE(5): Minute-of-hour in which an ascending node occurs

2. Function MOD (IVAR, N) - The value of this function is the integer remainder after dividing the first argument by the second. The calling sequence appearing in ASCEND is:

   MOD (IYEAR, 4)

   where IYEAR is the year associated with satellite data on the input ORB3A tape. The MOD function is used in determining whether the year represented by IYEAR is a leap year.

3.5 FLOWCHART

The flowchart for subroutine ASCEND appears in Figure 2.

3.6 RESTRICTION

The coding of subroutine ASCEND presumes that no more than one ascending node data item will appear in a single data record on the input ORB3A tape.

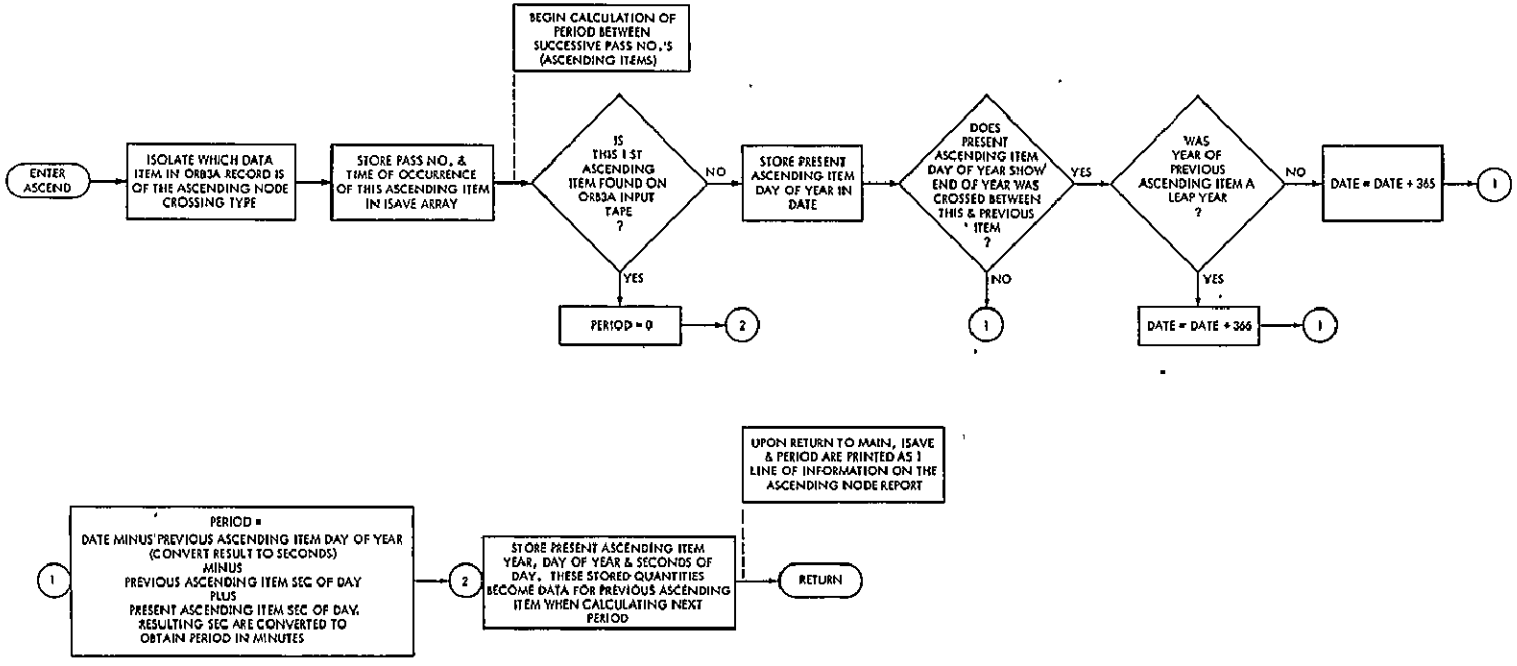


Figure 2 (sheet 1 of 1). Flowchart for Subroutine ASCEND of the S/360 TELOR3 Program

SECTION 4

SUBROUTINE DESCRIPTION -- SELECT TIME PERIOD (SELECT)

Subroutine Name and Program Number: SELECT, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

4.1 PURPOSE

Subroutine SELECT is used to select any period of data present on an input,binary ORB3A tape, and write this period on an output,binary ORB3A tape together with a revised title record containing the start and end times of the selected period.

4.2 METHOD

Backspacing and/or rewinding a 7-track,binary, input ORB3A tape is not allowed when using the special purpose FORTRAN library subroutine, DBFOR, which is required for reading this input tape with the S/360 series of computers (see subroutine description for RWTAP4). The capability is desired in subroutine SELECT for backspacing and/or rewinding an input ORB3A tape. To provide this capability, subroutine SELECT copies, onto a disk, the input ORB3A data records up through the first sentinel record or through the sentinel item record whichever the case may be. (The ORB3A title record has been previously read into the TITLE array by MAIN and TITLE is available to SELECT when needed.) The disk is then rewound, variables are initialized, and the requested period start and end times (year-month-day, hours-minutes) are read from the Select Period Input Card. The hours and minutes of the requested period start and end times are converted into requested start and end seconds-of-day. The requested time period is printed out

(year-month-day, seconds of day), and subroutine SELECT enters a search-for-start-time loop which performs the following steps.

1. Reads a record from the disk into the READIN array, increments the record counter (IRECRD) by one, and examines READIN(1) for the presence of 9's (99999999.).

2. If 9's are present, a sentinel record or a sentinel item record has been encountered which indicates the requested start time cannot be found on the input ORB3A tape. An error message stating this condition is printed out. Control is then returned to MAIN, and the program comes to a stop.

3. If 9's are not present, the year-month-day of the first satellite data item in the record (READIN(2)) is compared with the requested start year-month-day (ST).

4. If READIN(2) is equal to ST, a flag (IDATE) is set to one, which indicates that the requested start year-month-day has been found. A comparison is then made between the seconds-of-day of the first satellite data item in the record (READIN(4)) and the requested start seconds-of-day (SSEC).

5. If READIN(4) is less than SSEC, the requested period start time has not been found, SELECT returns to the beginning of the search-for-start-time loop, and another record is read from the disk into the READIN array.

6. If READIN(4) is equal to SSEC, the requested start time has been found, and corresponds to the first satellite data item in the record currently stored in READIN. An exit from the search-for-start-time loop occurs, the present value in the record counter (IRECRD) is saved in variable ISTREC, and the time of occurrence of the

first satellite data item in READIN (READIN(2), READIN(3), READIN(4))is stored in the satellite data start-time positions in the TITLE array (TITLE(4), TITLE(5), TITLE(6)). Thus the actual satellite data start time contained in TITLE is exactly equal to the requested period start time. A search-for-end-time loop now begins according to step 10.

7. If READIN(4) is greater than SSEC, a test is made to determine whether or not READIN contains the first data record (IRECRD equal one). If IRECRD is equal to one, the requested period start time is earlier than the time of the first satellite data item on the input ORB3A tape and, therefore, can not be found. Execution then proceeds according to step 2 above. If IRECRD is not equal to one, the requested period start time has been found but exists in the record just before the one presently stored in READIN, and processing proceeds to step 8.

8. Since the requested period start time exists in the record just before the one presently stored in READIN (the requested start time could be in any satellite data item other than the first one in the previous record), the disk is backspaced one record, the present value in the record counter (IRECRD) is decremented by one and saved in the variable ISTREC, and the previous record under consideration is read from the disk into READIN. The time of occurrence of the first satellite data item in READIN (READIN(2), READIN(3), READIN(4)) is stored in the satellite data start time positions in the TITLE array (TITLE (4), TITLE (5), TITLE (6)). Thus, the actual satellite data start time contained in TITLE is somewhat earlier than the requested start time. One record is read from the disk for positioning to the beginning of the record which has not yet been read from the disk. A search-for-end-time loop now begins according to step 10.

9. If READIN(2) is not equal to ST (as opposed to step 4 above), the flag IDATE is tested for the presence of a one. If IDATE contains a one, the requested start year-month-day has been found in the record just before the one presently stored in READIN and therefore, the requested period start time also exists in this previous record. Execution then proceeds according to step 8 above. If IDATE does not contain a one, the requested start year-month-day has not as yet been found in the first satellite data item of any record including the one presently stored in READIN. SELECT returns to the beginning of the search-for-start-time loop and another record is read from the disk into the READIN array.

10. A search-for-end-time loop begins after the requested period start time has been found, the no. of the data record on the disk containing the requested period start time has been stored in ISTREC, and the TITLE array has been changed to reflect the satellite data start time of the period of data to be written on the output ORB3A tape. A record is read from the disk into the READIN array, the record counter (IRECRD) is incremented by one, and READIN(1), is examined for the presence of 9's.

11. If 9's are not present, the year-month-day of the first satellite data item in the record (READIN(2))is compared with the requested end year -month-day (EN). If 9's are found, processing branches to step 24.

12. If READIN(2) is equal to EN, a flag (LDATE) is set to one (LDATE has been previously set to zero during SELECT initialization) which indicates the requested end year-month-day has been found, and a comparison is made between the seconds-of-day of the first satellite data item in the record (READIN(4)) and the requested end seconds-of-day (ESEC). For READIN(2) not equal to EN, proceed to step 19.

13. If READIN(4) is less than ESEC, the requested period end time has not been found, SELECT returns to the beginning of the search-for-end-time loop (step 10), and another record is read from the disk into the READIN array.

If READIN(4) is equal to ESEC, the requested period end time has been found and corresponds to the first satellite data item in the record currently stored in READIN. An exit from the search-for-end-time loop occurs, the present value in the record counter (IRECRD) is saved in a variable named IENREC, and the time of occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214))is stored in the satellite data end time positions in the TITLE array(TITLE(7), TITLE (8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is somewhat later than the requested end time. A read and copy operation now begins according to step 25.

15. If READIN(4) is greater than ESEC, the requested period end time has been found, but falls either within the record just before the one presently stored in READIN or falls between the last satellite data item in the previous record under consideration and the first satellite data item in the record presently stored in READIN. In order to ascertain which of these two possibilities is the case, SELECT proceeds as in step 16 below.

16. Since the requested period end time may be within the record just before the one presently stored in READIN (the requested end time could be in any satellite data item other than the first one in this previous record), the disk is backspaced one record and the previous record is read from the disk into READIN. A comparison is made between the seconds-of-day of the last satellite data item in READIN (READIN(214)) and the requested end seconds-of-day (ESEC).

17. If READIN(214) is greater than or equal to ESEC, the requested end time does exist within this previous record. The present value in the record counter (IRECRD), decremented by one is saved in variable IENREC and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE (7), TITLE (8), TITLE (9)). Thus, the actual satellite data end time contained in TITLE is either equal to or somewhat larger than the requested period end time. A read and copy operation now begins according to step 25.

18. If READIN(214) is less than ESEC, the requested period end time does not exist within the previous record. Instead, the requested period end time falls between the last satellite data item in this previous record and the first satellite data item in the next record on the disk (the record stored in READIN before backspacing). This next record is read from the disk into READIN, the present value in the record counter (IRECRD) is saved in the variable IENREC, and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is larger than the requested period end time. A read and copy operation now begins according to step 25.

19. If READIN(2) is not equal to EN (as opposed to step 12 above), the flag LDATE is tested for the presence of a one.

20. If LDATE contains a one, the requested end year-month-day has been found in the record just before the one presently stored in READIN, the disk is backspaced one record, and this previous record is read from the disk into READIN. A comparison is made between the year-month-day of the last satellite data item in READIN (READIN(212)), and the requested end year-month-day (EN).

21. If READIN(212) is not equal to EN, this previous record contains both the requested end year-month-day (at least in the first satellite data item from an earlier check) and a later end year-month-day (at least in the last satellite data item from the current check). Therefore, the requested period end time exists in this previous record. The present value in the record counter (IRECRD), decremented by one, is saved in the variable IENREC, and the time-of-occurrence of the last satellite data item in READIN (READIN(212), READIN(213), READIN(214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE(9)). Thus, the actual satellite data end time contained in TITLE is somewhat larger than the requested period end time. A read and copy operation now begins according to step 25.

22. If READIN(212) is equal to EN, this previous record contains the requested end year-month-day in all eleven satellite data items. A comparison is made between the seconds-of-day of the last satellite data item in the previous record (READIN(214)), and the requested end seconds-of-day (ESEC). If READIN(214) is greater than or equal to ESEC, execution proceeds according to step 17 above. If READIN(214) is less than ESEC, execution proceeds according to step 18 above.

23. If LDATE does not contain a one (as opposed to step 20 above), the requested end year-month-day has not as yet been found in the first satellite data item of any record including the one presently stored in READIN. SELECT returns to the beginning of the search-for-end-time loop, another record is read from the disk into the READIN array, the record counter (IRECRD) is incremented by one, and READIN(1) is examined for the presence of 9's.

24. If 9's are present (as opposed to step 11) a sentinel record, or a sentinel item record, has been encountered. The final data record on the disk (corresponds to the final data record on the input ORB3A tape) is then obtained by backspacing the disk one record and reading a record from the disk into READIN. The present value in the record counter (IRECRD), decremented by one, is saved in the variable IENREC, and the following test is made to determine whether or not this final data record (READIN) contains eleven valid satellite data items. The first word of each of the eleven satellite data items is checked for the presence of 9's. If 9's are not found, this record has eleven valid data items, and the variable named IFILL is left unchanged (IFILL is initialized to eleven). If 9's are found, this record has less than eleven valid data items, IFILL is set to zero, and the location of the last valid data item in the record is saved. If the end time of the last valid satellite data item is greater than or equal to the requested period end time, a read and copy operation now begins according to step 25. If the end time is less than the requested end time, an error message is printed stating that the requested period end time is greater than the last time on the input tape; but an output ORB3A tape will be generated anyway. A read and copy operation begins

according to step 25. Since SELECT has reached the final data record, the original (present) satellite data end time contained in the TITLE array is not changed and therefore, becomes the actual satellite data end time on the output ORB3A tape to be generated.

25. The read and copy operation is as follows. The disk is rewound and the TITLE array is written as the title record on the output ORB3A tape. Data records are then read from the disk and copied onto the output ORB3A tape for those records on the disk having record numbers between ISTREC and IENREC inclusive.

26. Sentinel type records are prepared and written on the output ORB3A tape in the following manner. A sentinel record is prepared by placing 9's in the first word of the TITLE array.

    If the last data record written on the output ORB3A has eleven valid data items (IFILL=11), a sentinel item record is prepared (9's are placed in the first 21 words of the last data record stored in the READIN array). A call is made to WSNEOF (an entry point to subroutine RWTAP4) in which instructions are executed to write one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

    If the last data record written on the output ORB3A does not have eleven valid data items (IFILL=0), WSNEOF is called and executes instructions which write two sentinel records and an end-of-file on the output ORB3A tape.

27. Control is returned to SELECT from WSNEOF. If the requested period end time has been found previously, a message is printed stating that the entire requested time period exists on the input ORB3A and has been written on the output ORB3A tape.

28. Finally, the actual start and end times (year-month-day, seconds-of-day) of the period of data written on the output ORB3A tape are printed for reference and a message is printed stating a normal termination of the Select Time Period Option has occurred. Control is then returned to MAIN, and the program comes to a stop.

4.3 USAGE

This section presents information defining the interfaces of subroutine SELECT with referenced external data sets, and other subprograms.

4.3.1 Calling Sequence

The calling sequence is:

```
CALL SELECT
```

There are no arguments in the calling sequence.

4.3.2 COMMON Areas

Subroutine SELECT makes use of information stored in the unlabeled COMMON area used in program TELOR3. This COMMON area is defined in the subroutine description for the routine MAIN (see Section 2.3.2).

4.3.3 External Data Sets

Subroutine SELECT references a scratch file on disk (FORTRAN logical unit number 14) for temporary storage of data records read from the input ORB3A tape. These data records are written in the scratch file by SELECT and are subsequently read from the scratch file in the process of creating the output ORB3A tape. The format of each data record stored in the temporary disk file is identical to the data record format on the input ORB3A tape. This format is described in detail in the description of subrouti RWTAP4 (see Section 7.3.3).

4.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from SELECT. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

4.4.1 Subroutines Called

Subroutine SELECT makes use of subroutine RWTAP4 to read records from the input ORB3A tape, and to write records on the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 - Called to read the input ORB3A tape.

WTAPE4 - Called to write title or data records on the output ORB3A tape.

WSNEOF - Called to write sentinel type records and an end-of-file on the output ORB3A tape.

The calling sequences used in SELECT are listed below:

```
CALL RTAPE4 (READIN, IERR)

CALL WTAPE4 (TITLE)

CALL WTAPE4 (READIN)

CALL WSNEOF (READIN, TITLE, IWORD)
```

The arguments appearing in these calling sequences are defined below:

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered.
Data are returned to calling program, but their validity is questionable.

IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.

= 1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

= 2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

READIN: A 256-word array used to store each data record read from the input ORB3A tape; and to store data records and sentinel item records ready to be written on the output ORB3A tape.

TITLE: A 256-word array used to store the title record read from the input ORB3A tape; and to store the title record and sentinel records ready to be written on the output ORB3A tape.

4.4.2 Functions Called

Subroutine SELECT makes use of the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in SELECT are:

FLOAT (IST)
FLOAT (IEN)
FLOAT (ISEC)
FLOAT (ISEC)

The arguments appearing in these calling sequences are defined below:

IST: Requested period start year-month-day

IEN: Requested period end year-month-day

ISEC: Requested period start seconds-of-day

ISEC: Requested period end seconds-of-day.

4.5 FLOWCHART

The flowchart for subroutine SELECT appears in Figure 3.

4.6 RESTRICTION

None

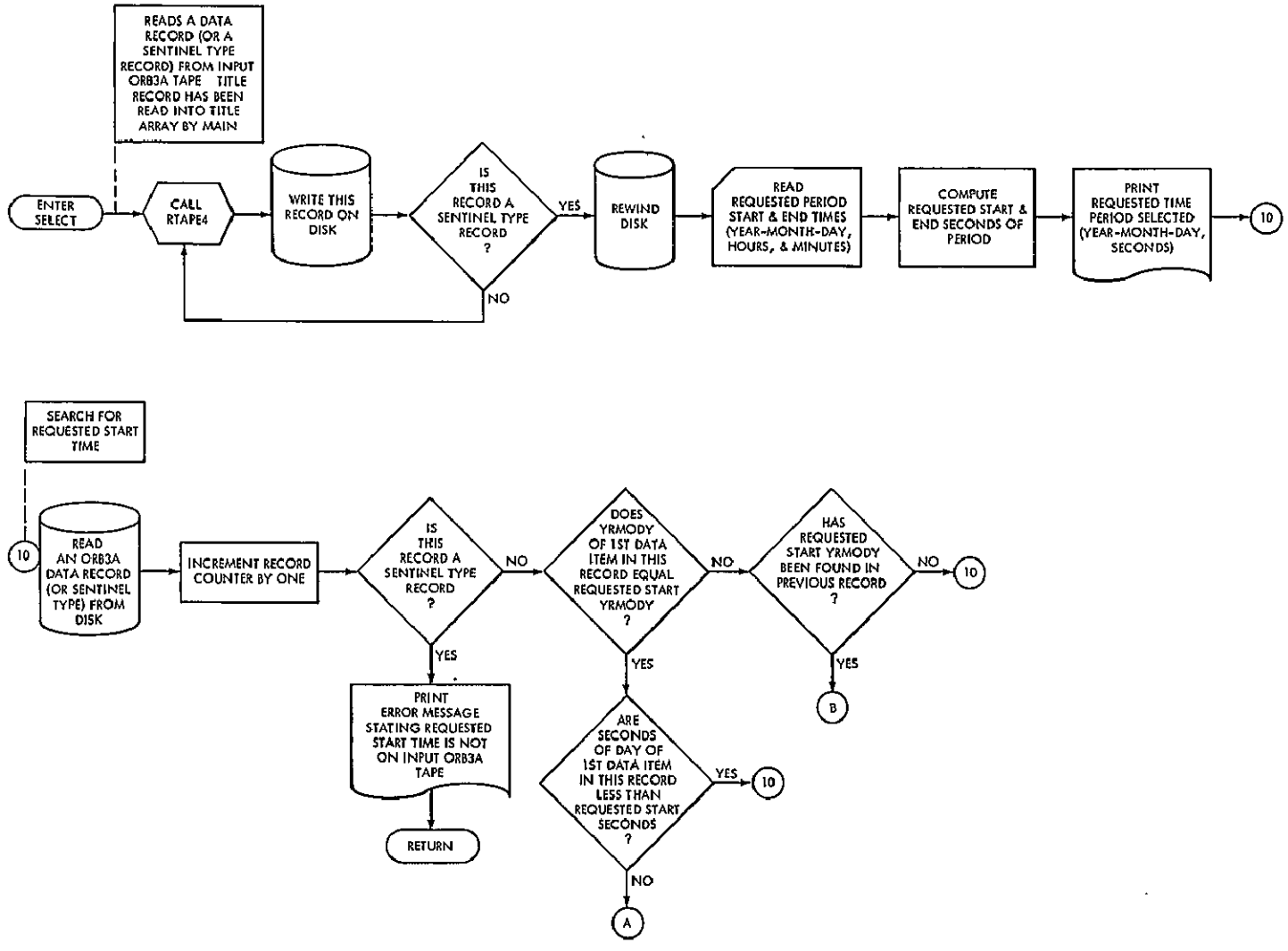


Figure 3 (sheet 1 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

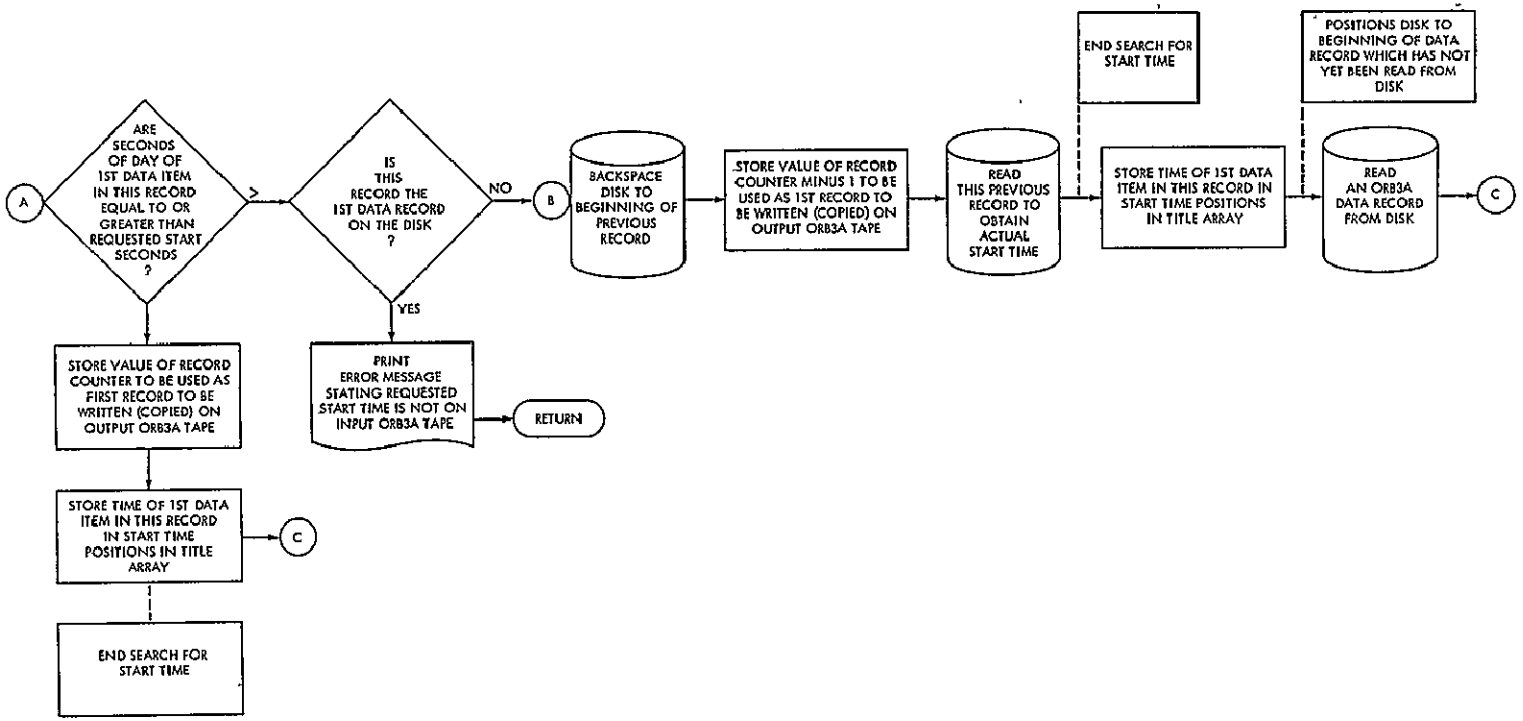


Figure 3 (sheet 2 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

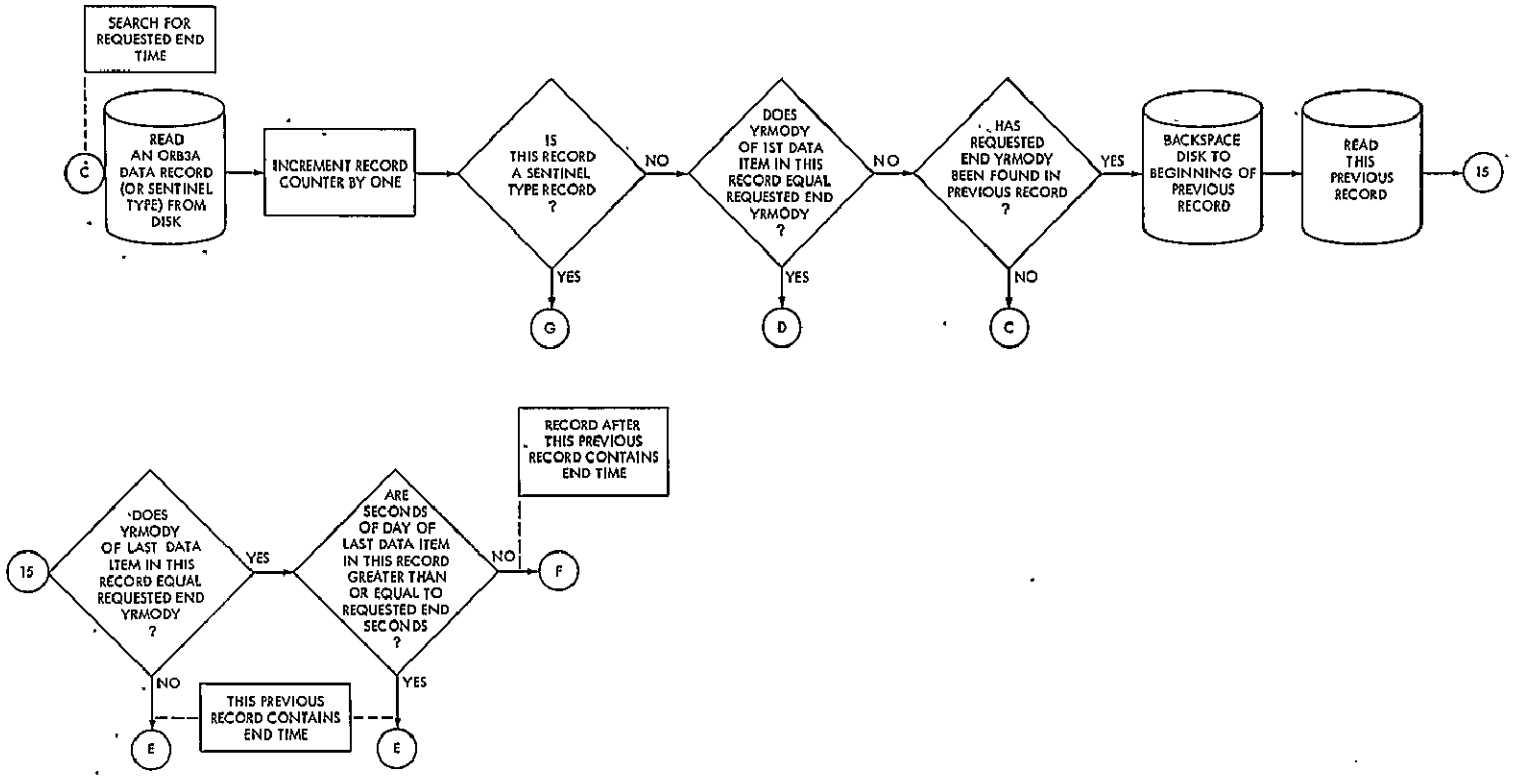


Figure 3 (sheet 3 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

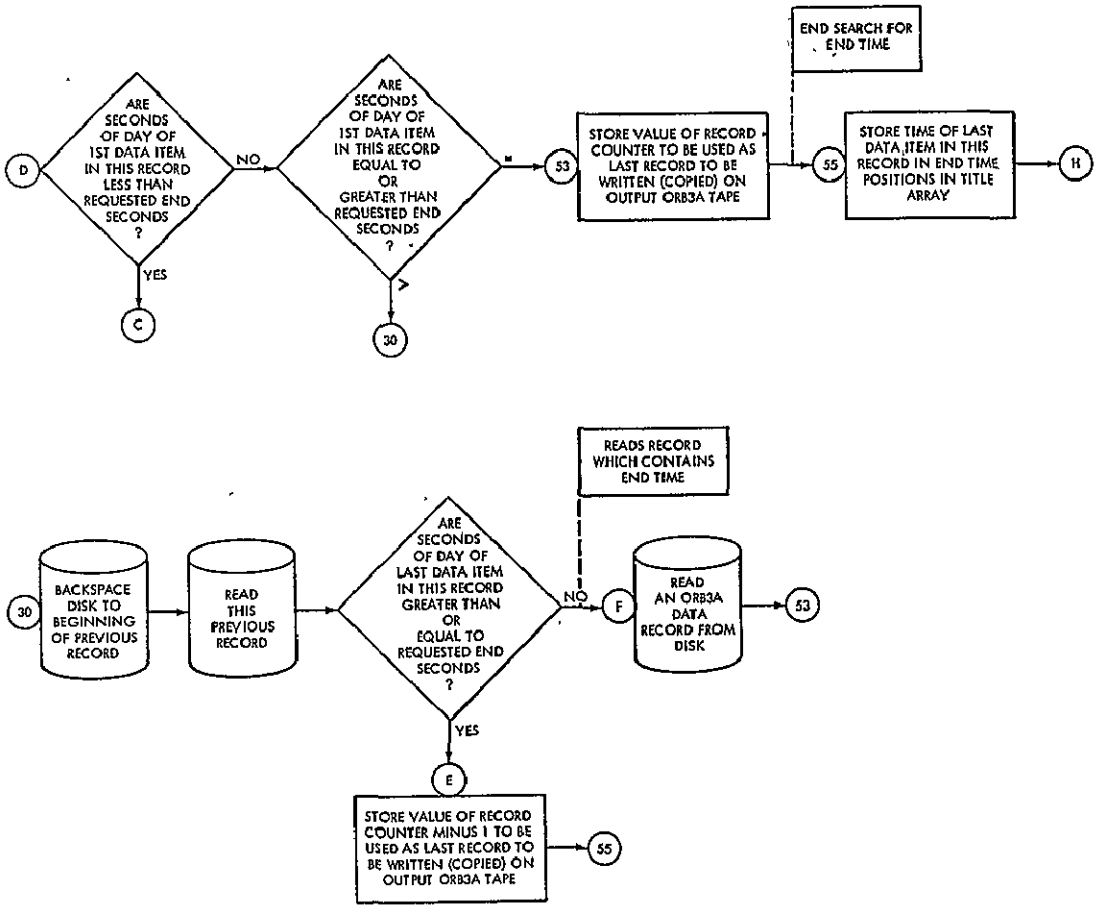


Figure 3 (sheet 4 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

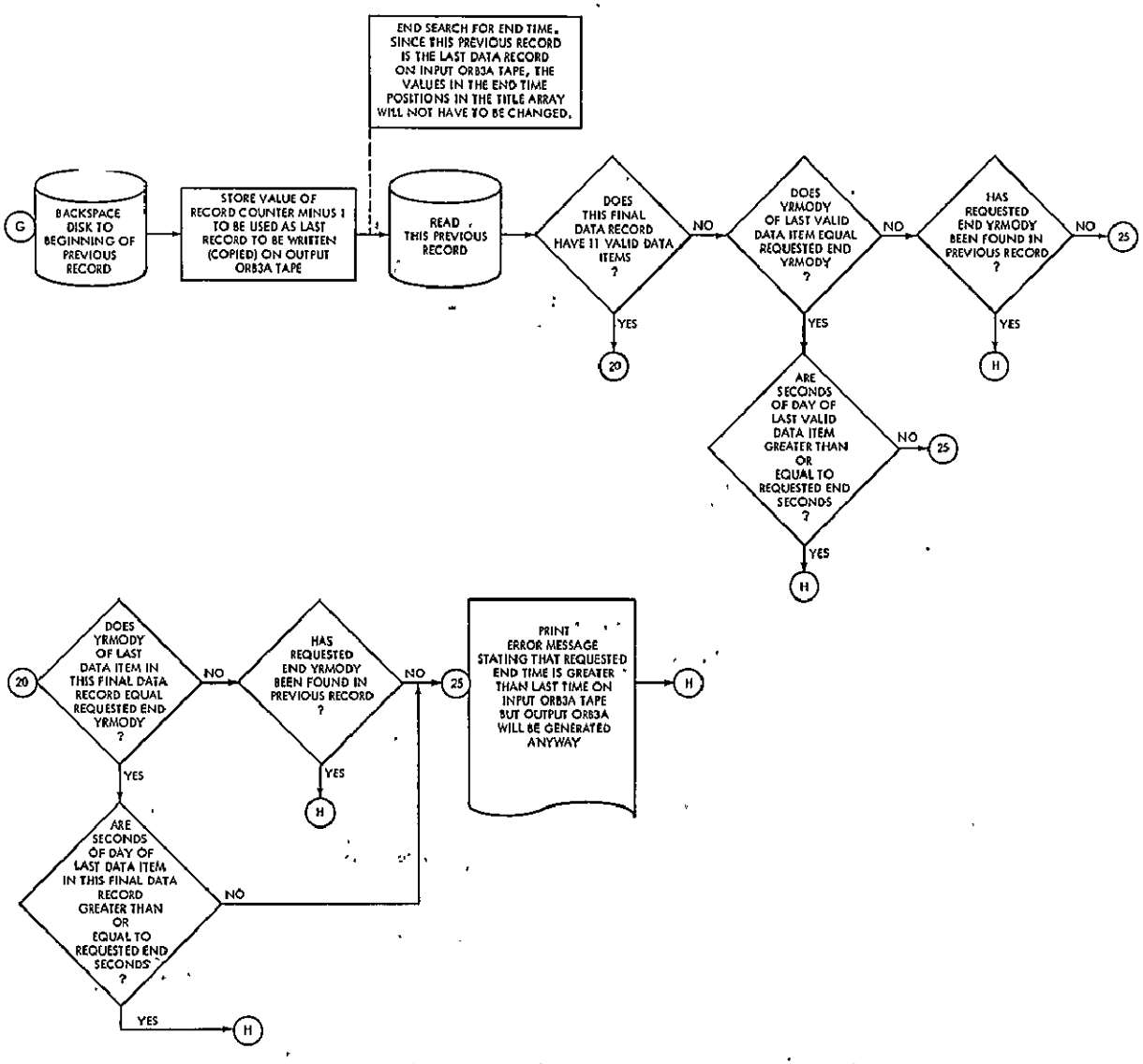


Figure 3 (sheet 5 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

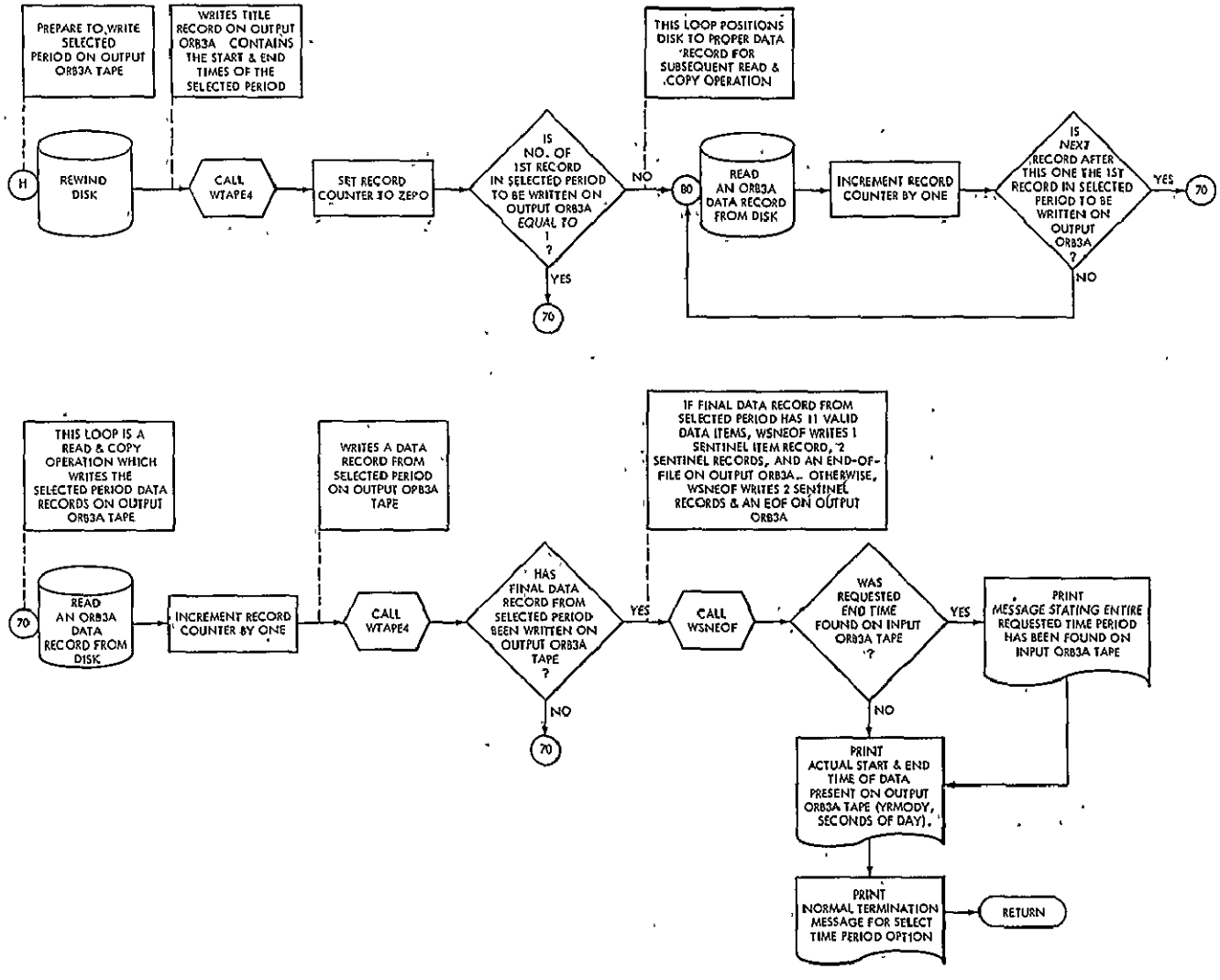


Figure 3 (sheet 6 of 6). Flowchart for Subroutine SELECT of the S/360 TELOR3 Program

SECTION 5

SUBROUTINE DESCRIPTION -- SUNLIGHT REPORT (SUNLGT)

Subroutine Name and Program Number SUNLGT, Number G00409

Programmer's Name Robert K. Schlessinger

Date May 7, 1971

5.1 PURPOSE

Subroutine SUNLGT isolates the satellite data items on an input ORB3A tape, which are of the sunlight entrance or exit type, and prints out a BCD sunlight report containing the pass number and time-of-occurrence of each of these sunlight entrance or exit data items.

5.2 METHOD

Subroutine SUNLGT first prints out the column headings for a sunlight report and then enters a loop which performs the following steps:

1. Reads an input ORB3A record into the READIN array.
2. Checks the record to see it if is a data or a sentinel record.
3. If it is a sentinel record, a loop exit occurs (described further in subsequent discussion).
4. If it is a data record, SUNLGT examines the type indicator (first word) of each of the eleven satellite data items in the record to determine whether or not a sunlight entrance or exit data item is present (type indicator equal to 6 or 7).
5. If no sunlight entrance or exit data item is present, SUNLGT returns to the beginning of the loop.

6. If a sunlight entrance data item is present (type indicator equal to 6), the pass number and time-of-occurrence of this entrance are stored and processing returns to the beginning of the loop.

7. If a sunlight exit data item is present (type indicator equal to 7), the pass number and time-of-occurrence of the last stored entrance item and of this exit item are printed as one line of output on the sunlight report. If the exit data item happens to be the first entrance or exit item on the input tape, there is no stored entrance data present, and the exit data are printed as the first line of output on the sunlight report. SUNLGT processing then returns to the beginning of the loop.

When a loop exit occurs (step 3 above), SUNLGT performs the following steps:

1. If the last stored entrance data item has not been printed out, this entrance data item is printed as the last line of output on the sunlight report. This case occurs when an entrance data item is the last entrance or exit item on the input tape.

2. One of two possible types of normal termination messages is printed on the sunlight report.

   a. Normal termination of the Sunlight Report Option has occurred.

   b. Normal termination of the Sunlight Report Option has occurred, but there were no sunlight entrances or exits on ORB3A input tape.

5.3 USAGE

This section presents information defining the interfaces of subroutine SUNLGT with referenced external storage areas, and other subprograms.

5.3.1 Calling Sequence

The calling sequence is:

```
CALL SUNLGT
```

There are no arguments in the calling sequence.

5.3.2 COMMON Areas

Subroutine SUNLGT does not make use of any COMMON areas.

5.3.3 External Data Sets

None

5.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from SUNLGT. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

5.4.1 Subroutines Called

Subroutine SUNLGT calls the RTAPE4 entry point of subroutine RWTAP4 to read data and sentinel records from the input ORB3A tape. The calling sequence used is:

```
CALL RTAPE4 (READIN, IERR)
```

The arguments appearing in this calling sequence are defined below:

READIN: A 256 word array used to store the data or sentinel record read from the input ORB3A tape.

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions

= 1; End-of-file encountered

= 4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

5.4.2 Functions Called

Subroutine SUNLGT makes use of the IBM system function FLOAT (IVAR) several times to convert the integer argument variable, represented by IVAR, to a real variable without round off. The calling sequences appearing in SUNLGT are:

FLOAT (INHR)

FLOAT (INMIN)

FLOAT (IOHR)

FLOAT (IOMIN)

The arguments appearing in these calling sequences are defined below:

INHR: Hour-of-day for a sunlight entrance data item

INMIN: Minute-of-hour for a sunlight entrance data item

IOHR: Hour-of-day for a sunlight exit data item

IOMIN: Minute-of-hour for a sunlight exit data item.

5.5 FLOWCHART

The flowchart for subroutine SUNLGT appears in Figure 4.

5.6 RESTRICTION

The coding of subroutine SUNLGT presumes that no more than one sunlight entrance or sunlight exit data item will appear in a single data record on the input ORB3A tape.

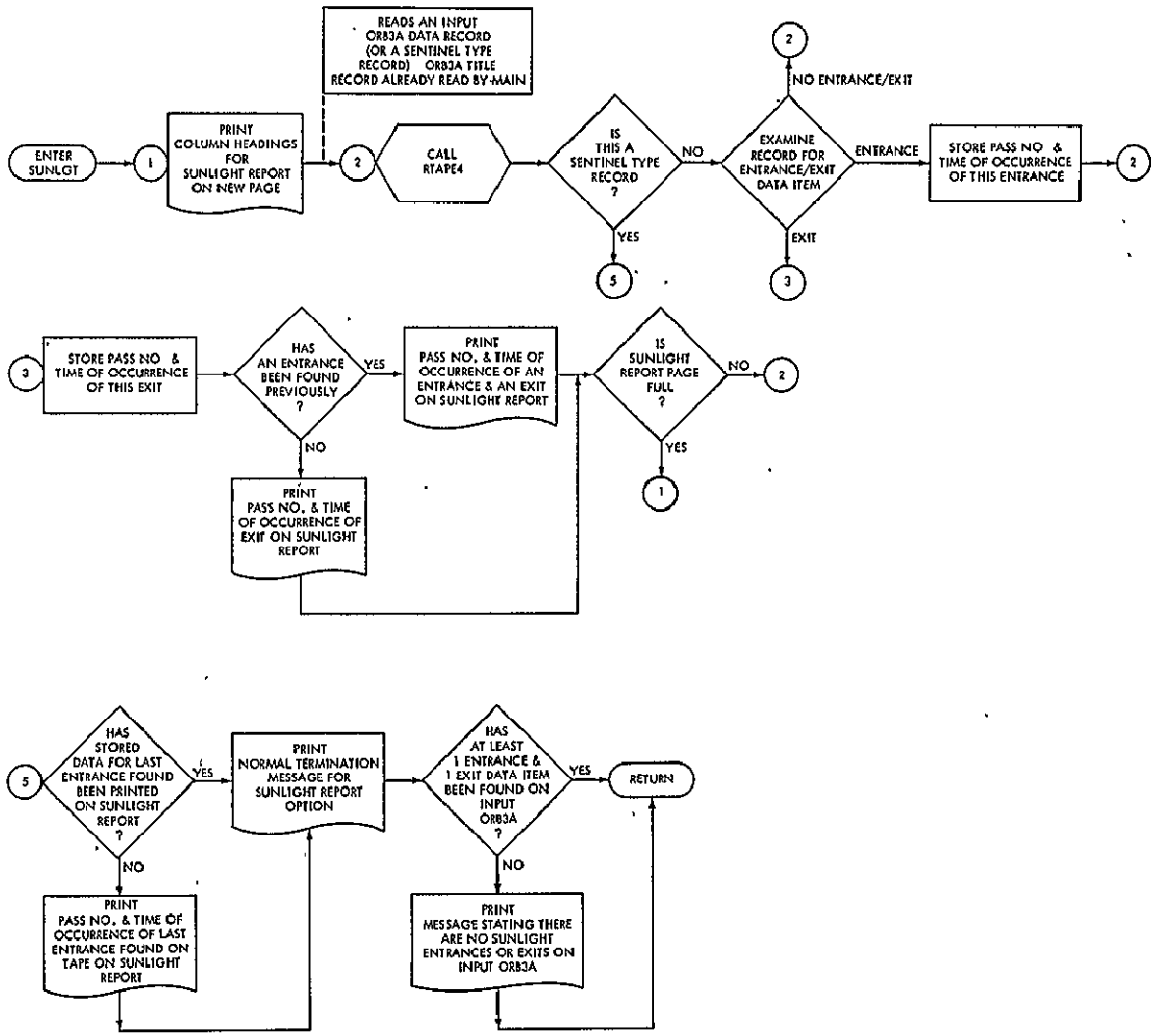


Figure 4 (sheet 1 of 1). Flowchart for Subroutine SUNLGT of the S/360 TELOR3 Program

SECTION 6

SUBROUTINE DESCRIPTION -- CHECK ORB3A RECORD (CHKREC)

Subroutine Name and Program Number: CHKREC, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

6.1 PURPOSE

Subroutine CHKREC is used to check binary ORB3A tapes which had an abnormal run termination when being generated. Selected words in each record of the input ORB3A tape are checked for data errors, and each record is checked for a read error. The first input ORB3A record to fail any one of these checks causes an output, binary ORB3A tape to be generated, with the period of data extending through the next-to-the-last record preceding the check-fail record. The output tape has a revised title record containing the new end time for the satellite data.

6.2 METHOD

Backspacing and/or rewinding of a 7-track, binary, input ORB3A tape is not permitted when using the special purpose FORTRAN library subroutine, DBFOR, which is required for reading this input tape (see subroutine description for RWTAP4). Since this capability is desired in subroutine CHKREC, for backspacing and/or rewinding an input ORB3A tape, subroutine CHKREC copies, onto a scratch disk, the input ORB3A data records (including any having read errors) up to the end-of-file. (The ORB3A title record has been previously read into the TITLE array by MAIN and TITLE is available to CHKREC when needed.) An end-of-file is then written on the disk, the disk is rewound, and CHKREC enters a loop which performs the following steps.

1. Reads a record from the disk into the READIN array.
2. If a read error or an end-of-file is encountered, an appropriate message is printed out, a loop exit occurs, and execution proceeds according to the logic described in steps 6 through 15 below.
3. If a read error or an end-of-file is not encountered, the data in five key words of the record (READIN) are given the following tests.
   a. Is the day count of the year of the first satellite data item in this record (READIN(3)) equal to or one greater than the day count of the year of the first satellite data item in the previous record?
   b. Is the second-of-day of first satellite data item in this record (READIN(4)) less than 86400 seconds, and greater than or equal to zero seconds?
   c. Is the third word of the special type of data item (READIN(234)) in this record equal to 999. or equal to a value between zero and 100 inclusive?
   d. Does the type indicator of the first satellite data item in this record (READIN(1)) have a value between one and seven inclusive?
   e. Is the first word of the special type of data item (READIN (232)) in this record equal to 99. ?
4. If the results of all of the above five tests are affirmative, CHKREC returns to the beginning of the loop and the next record is read from the disk into the READIN array.

5. If the result of any one of the above five tests is negative, an appropriate error message is printed, a loop exit occurs, and the following steps (6 through 15) are executed.

6. The check-fail record is printed out for reference except if coming from step 2 above. If coming from step 2, a read error or an end-of-file has been encountered. Printing out an end-of-file cannot be done and printing out the record causing a read error is not attempted since this record is not always accessible.

7. The disk is positioned to the beginning of the next-to-the-last record immediately preceding the check-fail record and this record is read from the disk into the READIN array.

8. The time of occurrence of the last satellite data item in this record (READIN (212), READIN (213), and READIN (214)) is stored in the satellite data end time positions in the TITLE array (TITLE(7), TITLE(8), TITLE (9), respectively).

9. The TITLE array now corresponds to a revised title record, containing the new end-time of the satellite data, and is written as the title record of the output ORB3A tape. The next-to-the-last record preceding the check-fail record, rather than the last record before the check-fail record, is considered to be the last good data record on the input ORB3A tape for the following reason. Three out of the five key words checked in a data record involve only the first satellite data item. It is conceivable these three words could pass inspection, but one or more of the same words in the ten remaining satellite data items in the record could be in error. Therefore, as a precaution, the next-to-the-last record before the check-fail record is considered to be the last good data record on the input ORB3A tape.

10. The disk is rewound and a read and copy operation is executed as follows: A data record is read from the disk into the READIN array and then written on the output ORB3A tape. A test is made to determine whether or not the time-of-occurrence of the last satellite data item in this record (READIN (212), READIN (213), READIN (214)) is equal to the satellite data end time contained in the TITLE array (TITLE (7), TITLE (8), TITLE (9)). If these items are not equal, the read and copy operation continues. If these times are equal, no more data records are to be written on the output ORB3A, the read and copy operation comes to a halt, and the last data record written on the output ORB3A is printed for reference.

11. The output ORB3A title record is printed for reference.

12. A sentinel item record is prepared (9's are placed in the first 21 words of the last data record stored in the READIN array).

13. A sentinel record is prepared (9's are placed in the first word of the TITLE array).

14. A call is made to WSNEOF (an entry point to subroutine RWTAP4) in which instructions are executed to write one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

15. A message is printed stating that normal termination of the Check Record Option has occurred, control is returned to MAIN, and the program comes to a stop.

6.3 USAGE

This section presents information defining the interfaces of subroutine CHKREC with referenced external data sets, and other subprograms.

6.3.1 Calling Sequence

The calling sequence is:

```
CALL CHKREC
```

There are no arguments in the calling sequence.

6.3.2 COMMON Areas

Subroutine CHKREC makes use of information stored in the unlabeled COMMON area used in program TELOR3. This COMMON area is defined in the subroutine description for the routine MAIN (see Section 2.3.2).

6.3.3 External Data Sets

Subroutine CHKREC references a scratch file on disk (FORTRAN logical unit number 14) for temporary storage of data records read from the input ORB3A tape. These data records are written in the scratch file by CHKREC, and are subsequently read from the scratch file in the process of creating the output ORB3A tape. The format of each data record, as stored in the temporary disk file, is identical to the data record format on the input ORB3A tape. This format is described in detail in the subroutine description for subroutine RWTAP4 (see Section 7.3.3).

6.4 SUBPROGRAMS CALLED

This section identifies the subroutines and functions called from CHKREC. Calling sequences used are presented, followed by definitions of the arguments appearing in the calling sequences.

6.4.1 Subroutines Called

Subroutine CHKREC makes use of subroutine RWTAP4 to read records from the input ORB3A tape, and to write records on the output ORB3A tape. RWTAP4 has three entry points:

RTAPE4 - Called to read the input ORB3A tape

WTAPE4 - Called to write title or data records on the output ORB3A tape.

WSNEOF - Called to write sentinel records and an end-of-file on the output ORB3A tape.

The calling sequences used in CHKREC are listed below:

CALL RTAPE 4 (READIN, IERR)

CALL WTAPE 4 (TITLE)

CALL WTAPE 4 (READIN)

CALL WSNEOF (READIN, TITLE, IWORD)

The arguments appearing in these calling sequences are defined below:

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

=0; No unusual conditions

=1; End-of-file encountered

=4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.

=1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

=2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

READIN: A 256-word array used to store each data record read from the input ORB3A tape; and to store data records, and sentinel item records, ready to be written on the output ORB3A tape.

TITLE: A 256-word array used to store the title record read from the input ORB3A tape; and a title record or a sentinel record ready to be written on the output ORB3A tape.

6.4.2 Functions Called

None

6.5 FLOWCHART

The flowchart for subroutine CHKREC appears in Figure 5.

6.6 RESTRICTION

If an entirely good input ORB3A tape is processed by subroutine CHKREC, an output ORB3A tape will be generated with the last output ORB3A data record corresponding to the next-to-the-last data record on the input ORB3A tape.

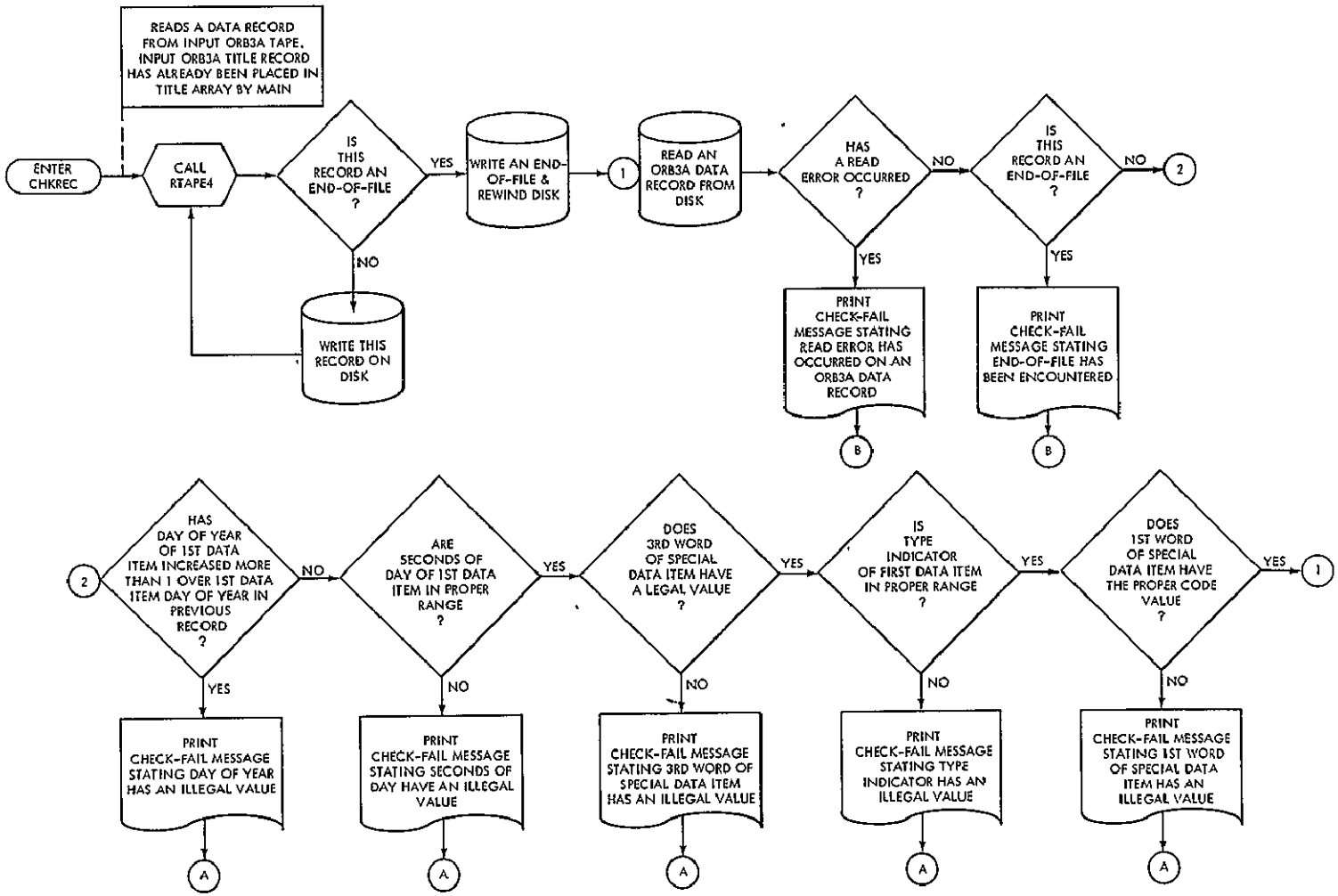
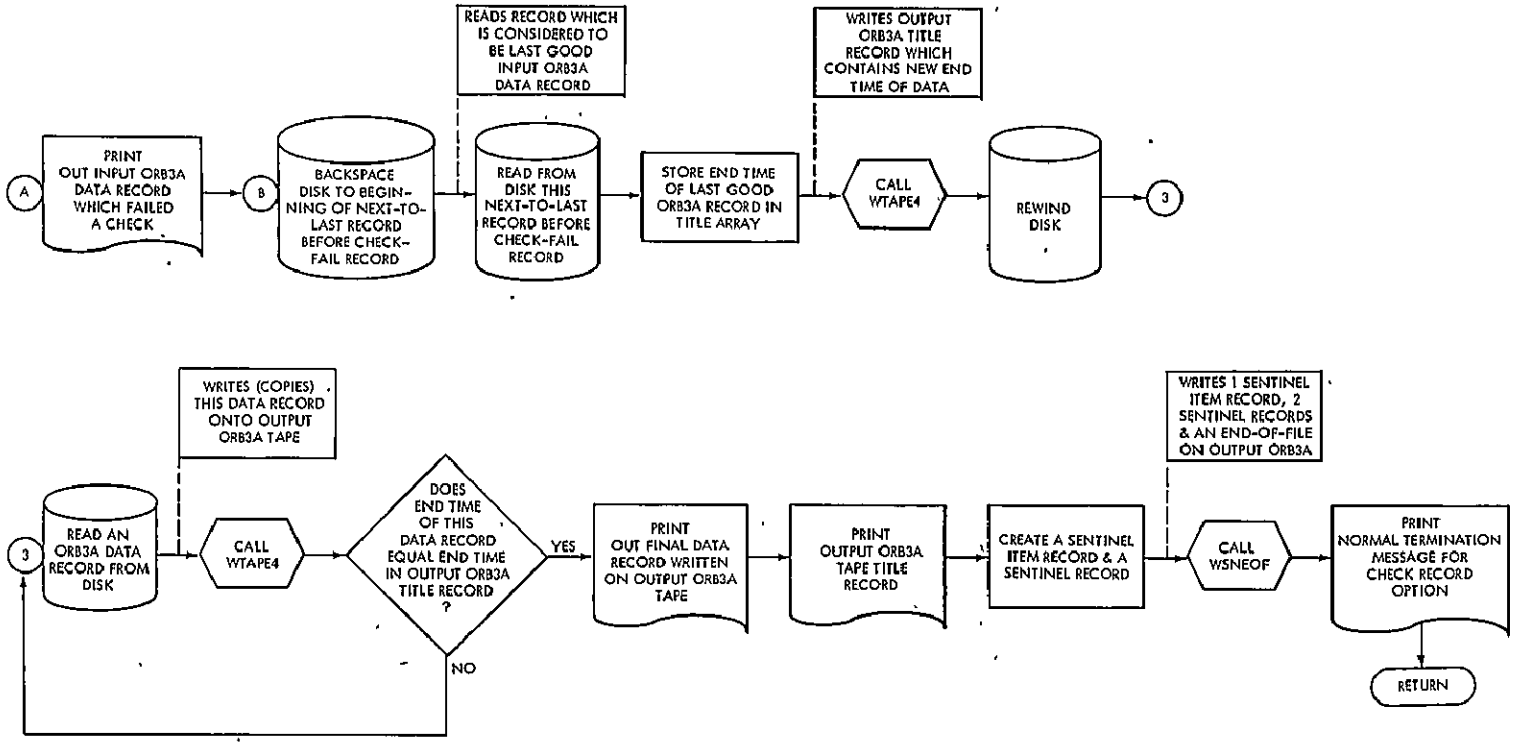


Figure 5 (sheet 1 of 2). Flowchart for Subroutine CHKREC of the S/360 TELOR3 Program



NOTE

1. NEXT-TO-LAST RECORD BEFORE THE CHECK-FAIL RECORD RATHER THAN THE LAST RECORD BEFORE THE CHECK-FAIL RECORD IS CONSIDERED TO BE THE LAST GOOD DATA RECORD FOR THE FOLLOWING REASON. THREE OUT OF THE 5 KEY WORDS CHECKED IN A DATA RECORD INVOLVE ONLY THE 1ST DATA ITEM. IT IS CONCEIVABLE THESE 3 WORDS COULD PASS INSPECTION BUT ONE OR MORE OF THE SAME WORDS IN THE 10 REMAINING DATA ITEMS IN THE RECORD COULD BE IN ERROR THEREFORE, AS A PRECAUTION, THE NEXT-TO-THE-LAST RECORD BEFORE THE CHECK-FAIL RECORD IS CONSIDERED TO BE THE LAST GOOD DATA RECORD ON THE INPUT ORB3A TAPE.

Figure 5 (sheet 2 of 2). Flowchart for Subroutine CHKREC of the S/360 TELOR3 Program

SECTION 7

SUBROUTINE DESCRIPTION -- READ-WRITE ORB3A TAPE (RWTAP4)

Subroutine Name and Program Number: RWTAP4, Number G00409

Programmer's Name: Robert K. Schlessinger

Date: May 7, 1971

7.1 PURPOSE

Subroutine RWTAP4 is used to read a 7-track, binary, single precision, ORB3A tape which is the input to the S/360 TELOR3 Program. In addition, RWTAP4 is called to create an output ORB3A tape in the same format as the input ORB3A tape.

7.2 METHOD

For each record to be read from the 7-track, binary, input ORB3A tape, it is necessary to make a call to entry point RTAPE4 of subroutine RWTAP4. After entering at RTAPE4 the following steps are executed.

1. A call is made to the special purpose FORTRAN library subroutine DBFOR (see Reference 2). DBFOR allows a 7-track FORTRAN tape to be read on a S/360 series computer and provides one logical record in the proper format for processing according to step 2 below.

2. A call is made to the special purpose FORTRAN library subroutine CNVRT (see Reference 2) immediately after the call to DBFOR. The CNVRT subroutine converts the single precision 7094 floating point data in the logical record provided by DBFOR to double word S/360 floating point structured data, and places the results in the 256-word array named RECORD. Control is then returned to the calling subroutine.

Since RECORD is in the argument list of RTAPE4, the data in the RECORD array is available to the subroutine which called RTAPE4, and can be readily processed without further manipulation.

For each record to be written on the output,7-track, binary ORB3A tape containing single precision floating point data, it is necessary to make a call to entry point WTAPE4 of subroutine RWTAP4. After entering at WTAPE4 the following steps are executed.

1. A call is made to DATCON (see Reference 3) which consists of an existing set of S/360 Assembler Language subroutines modified for TELOR3 Program purposes to omit the complementing of negative numbers when performing the following manipulation. DATCON converts the double word S/360 floating point data in the array RECORD (in the WTAPE4 argument list) to single precision, 7094-form, floating point data.

2. A second call is made to DATCON immediately after the first call and the converted data (single precision, 7094-form floating point) are written as one logical record on the 7-track, binary,output ORB3A tape. Control is then returned to the calling subroutine.

One call to entry point WSNEOF of subroutine RWTAP4 writes the appropriate number of sentinel item records, sentinel records, and an end-of-file on the output,7-track ORB3A tape. The method used to write these sentinel records is identical to that employed in entry point WTAPE4 processing described previously. WSNEOF logic is as follows.

1. The IWORD flag passed through the argument list of WSNEOF controls branching in the following manner.

    a. If IWORD equals one, six calls are made to DATCON

(with each two calls writing one record), resulting in one sentinel item record and two sentinel records being written on the output ORB3A tape. Finally, a single call is made to DATCON with a special flag (-2) in the argument list. This call causes an end-of-file to be written on the output ORB3A tape. Control is then returned to the calling subroutine.

b. If IWORD equals two, four calls are made to DATCON (with each two calls writing one record) resulting in two sentinel records being written on the output ORB3A tape. Finally, a single call is made to DATCON to write an end-of-file on the output ORB3A tape. Control is then returned to the calling subroutine.

It should be noted that when DATCON is used, two initialization calls must be made to this subroutine. These two calls are accomplished as follows. In the initialization section of MAIN a call is made to RWTAP4 (standard entry point). Upon entering RWTAP4 the following steps are executed.

1. A call is made to DATCON with a special flag (97) in the argument list. This flag causes the output ORB3A tape to be generated by DATCON to actually have a UNIVAC 1107 type format.

2. A second call is made to DATCON with the argument list specifying the FORTRAN logical unit number on which the output tape will be written (unit number 15) and specifying the number of 36-bit words in one record on the output tape (253 data words; control words are not to be counted). Control is then returned to MAIN.

7.3 USAGE

This section presents information defining the interfaces of subroutine RWTAP4 with referenced external storage areas, and other subprograms.

7.3.1 Calling Sequence

The calling sequences of the standard entry point and the three nonstandard entry points are, respectively:

```
CALL RWTAP4

CALL RTAPE4 (RECORD, IERR)

CALL WTAPE4 (RECORD)

CALL WSNEOF (RECORD, RECRD1, IWORD)
```

The arguments appearing in the RTAPE4 calling sequence are defined below:

RECORD: A 256-word array used to store a record read from the input ORB3A tape.

IERR: An error indicator returned by subroutine RWTAP4 reflecting unusual conditions encountered in reading the input ORB3A tape.

- = 0; No unusual conditions.
- = 1; End-of-file encountered
- = 4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

The argument appearing in the WTAPE4 calling sequence is defined below:

RECORD: A 256-word array used to store a title record or a data record ready to be written on the output ORB3A tape.

The arguments appearing in the WSNEOF calling sequence are defined below:

RECORD: A 256-word array used to store a sentinel item record ready to be written on the output ORB3A tape.

RECRD1: A 256-word array used to store a sentinel record ready to be written on the output ORB3A tape.

IWORD: Flag used in WSNEOF processing for branching, set by the calling routine.

= 1; WSNEOF writes one sentinel item record, two sentinel records, and an end-of-file on the output ORB3A tape.

= 2; WSNEOF writes two sentinel records and an end-of-file on the output ORB3A tape.

7.3.2 COMMON Areas

Subroutine RWTAP4 does not make use of any COMMON areas.

7.3.3 External Data Sets

Subroutine RWTAP4 interfaces with two external data sets:

1. The input, binary ORB3A tape.

2. The output, binary ORB3A tape.

These tapes are read or written, as appropriate, by subroutine RWTAP4. A detailed description of the content and format of these input and output tapes (which are identical in format) follows.

The format of a 7-track floating point binary ORB3A tape is defined in Tables 1, 2, and 3. It can be seen there are three kinds of records on an ORB3A tape: (1) the title record (Table 1); (2) data records (Table 2); and (3) sentinel records (Table 3). Each record contains 256 words. A set of notes pertaining to format for all three record types appears at the end of Table 3. Actual floating point dumps of an ORB3A title and data record are shown in Figure A-6.

TABLE 1: ORB3A Tape Title Record Format

Word Number	Description	
0	FORTRAN data record size indicator=000375010001_8 (Underlined octal number indicates a total data word count of 253 words).	
1	Form of data identification = 76799361	
2-3	Satellite identification	
4	Date	U.T. Start Time of Satellite Data
5	Day Count of Year	
6	Seconds of Day	
7	Date	U.T. End Time of Satellite Data
8	Day Count of Year	
9	Seconds of Day	
10	$=\Delta t$ in seconds, if tape has equal intervals = 0, if tape has unequal intervals	
11	No. of data items in data record = 12 (includes a special type of item as item no. 12)	
12	No. of words per data item = 21	
13	No. of words per data item that are a function of time (these words follow the time words consecutively) = 16	
14	No. of words in data record = 256	
15	Spare	
16-2C	Run identification data	
27	Date	Coordinate System Reference Data Time and Position
28	Day Count of Year	
29	Apparent Sidereal Time in radians	
30-4C	Used for harmonics, etc.	

TABLE 1: ORB3A Tape Title Record Format (Continued)

Word Number	Description	
41	Date	Epoch
42	Day Count of Year	
43	Seconds of Day	
44	Semi-major axis, a (km.)	
45	Eccentricity, e (ratio)	
46	Inclination, I (deg.)	
47	Right ascension of ascending node, Ω (deg.)	
48	Rate of change of R. A. of ascending node, $\dot{\Omega}$ (deg./day)	
49	Argument of perigee, ω (deg.)	
50	Rate of change of argument of perigee, $\dot{\omega}$ (deg./day)	
51	Period, P (min.)	
52	Rate of change of period, $\dot{P}$ (min./day)	
53-253	Used for elements, drags, etc.	
254	Check sum of words in word no. 1-253	
255	Same as word 0	

TABLE 2: ORB3A Tape Data Record Format

Word Number	Description	
0	FORTRAN data record size indicator = $\underline{000375}010001_8$ (Underlined octal number indicates a total data word count of 253 words.)	
1	Type of data item indicator 1 = regular satellite data item 2 = ascending node crossing data item 3 = north point data item 4 = descending node data item 5 = south point data item 6 = sunlight entrance data item 7 = sunlight exit data item	
2	Date of data	Time of Data Item
3	Day Count of Year	
4	Seconds of Day	
5	X	Satellite Position Vector in km.
6	Y	
7	Z	
8	$\dot{X}$	Satellite Velocity Vector in km./sec.
9	$\dot{Y}$	
10	$\dot{Z}$	
11	Longitude (deg.)	Geodetic Position
12	Latitude (deg.)	
13	Height above spheroid (km.)	
14	SX	Solar Vector in A.U.
15	SY	
16	SZ	
17	L (earth radii)	McIlwain L Parameter
18	B (Gauss)	Magnetic Field Strength

TABLE 2: ORB3A Tape Data Record Format (Continued)

Word Number	Description	
19	Right ascension (deg.)	Real Field Inertial Coordinates
20	Declination (deg.)	
21	Ascending node crossing no. (pass no.)	
22-231	10 other satellite data items	
232	=99 (type of data indicator)	
233	Year of Data	
234	= 999 if no ascending node item occurred = % of orbit in sunlight if an ascending node item occurred in this record	
235-252	Spares in last item	
253	Spare in record	
254	Check sum of data words in word no. 1-253	
255	Same as word 0	

TABLE 3: ORB3A Tape Sentinel Record Format

Word Number	Description
0	FORTRAN data record size indicator = $0\underline{00375}010001_8$ (Underlined octal number indicates a total data word count of 253 words.)
1	99999999
2-253	Irrelevant
254	Check sum of data words in word no. 1-253
255	Same as word 0

NOTES (for Tables 1, 2, and 3)

1. All words are in floating point form except for words 0, 254, and 255, which are in fixed point form.
2. Longitude is positive east of Greenwich; negative west.
3. Northern latitudes are positive; southern latitudes are negative.
4. Date of data = day + 100 (months + year (100)). (Example: Feb. 10, 1962 at 2 hours is recorded as 620210 in date of data, 41 in day count of year and 7200 in seconds of day).
5. The satellite and the solar position vectors are referenced to an equatorial coordinate system with the origin at the center of the earth, the x-axis in the direction of the vernal equinox, the z-axis along the North Pole of the earth, and the y-axis forming a right-handed coordinate system.
6. Reference day data of apparent sidereal time is obtained from "The American Ephemeris and Nautical Almanac" for the given year.

TABLE 3: ORB3A Tape Sentinel Record Format (Continued)

7. The last valid data item in a data record is followed by an item of 9's. If the last valid data item fills a record, a data binary record follows which contains 9's in words 1-21. 9's are equal to 99999999 in floating point.

Information in an ORB3A title record, used by the TELOR3 Program, consists of: the ORB3A tape identification code (word 1); the satellite identification (words 2 and 3); the start time of satellite data on the tape (words 4, 5, and 6); and the end time of satellite data on the tape (words 7, 8, and 9).

A data record (Table 2) contains eleven satellite data items plus one special type of data item. The twelve data items contain 21 words each. Information used by the TELOR3 Program from a satellite data item consists of: the data item type indicator (word 1 in each data item); the data item time-of-occurrence (words 2, 3, and 4 in each data item); and the ascending node crossing number, or pass number (the 21st word in each data item). The pass number in a satellite data item is one larger than the preceding data item pass number, when the present data item is of the ascending node crossing type. If a data item is of the ascending node crossing type, the first word of the data item contains a type indicator equal to 2.

Any particular ORB3A tape can have all regular satellite data items separated by equal intervals of time. Typical intervals are 60 and 120 seconds. Regular satellite data items on a given tape can also be separated by unequal intervals of time. The tenth word in the ORB3A title record contains the time interval in seconds, if equal intervals are involved, or a zero if unequal intervals are involved.

Information stored in the third word of the special type of data item in a data record is used by the TELOR3 Program. The presence of 999. in this word indicates that no ascending node data item exists in the entire record.

A sentinel record (Table 3) results from placing nines (99999999) in the first word of a data record. A sentinel record appears after either of two possible forms of a final data record on an ORB3A tape. When there is not enough data available to fill all eleven satellite data items in the last data record on the tape (which is usually the case), the next data item is filled with nines (all 21 words). This form of a final data record is followed by two sentinel records and an end-of-file. The second form (relatively rare) of final data record exists when there is exactly enough data to fill all eleven satellite data items in the last data record on the tape. This form of a final data record is followed by one sentinel item record (a data record containing nines in the first 21 words), two sentinel records, and an end-of-file.

7.4 SUBPROGRAMS CALLED

This section identifies the subprograms (subroutines and functions) called from RWTAP4. The CALL statement for each call to each subprogram is given, followed by a definition of the calling sequence arguments. Where multiple calls to the same program are made from RWTAP4, the calls are presented in the order in which they appear in the source listing.

7.4.1 Subroutines Called

1. Subroutine DBFOR - This subroutine is called to read the input, 7-track, binary ORB3A tape and provides one logical record in the proper format for processing by subroutine CNVRT.

2. Subroutine CNVRT - This subroutine is called to convert the single precision 7094-form floating point data in the logical record provided by DBFOR to double word, S/360, floating point structured data and place the results in the 256-word array named RECORD.

3. Subroutine DATCON - This subroutine is called to convert the double word, S/360 floating point data in the array RECORD or RECRD1 to single precision, 7094-form floating point data, and to write the converted data as one logical record on the output, 7-track, binary ORB3A tape.

The calling sequences used in RWTAP4 and definitions of the arguments in these calling sequences are listed below.

1. Calls to DBFOR

CALL DBFOR (256, IADD, IERR)

The calling sequence arguments are defined below.

256: The size of an input ORB3A tape logical record in 7094 words (includes control as well as data words).

IADD: The beginning address of the input ORB3A tape logical record read and stored by DBFOR. Returned to the calling program (RWTAP4) from DBFOR.

IERR: An error indicator returned to the calling program (RWTAP4) reflecting unusual conditions encountered in reading the input ORB3A tape.

= 0; No unusual conditions
= 1; End-of-file encountered
= 4; Permanent read error encountered. Data are returned to calling program, but their validity is questionable.

2. Calls to CNVRT

CALL CNVRT (IADD, RECORD, 256, 2, JERR, 1)

The calling sequence arguments are defined below.

IADD: The beginning address of the input ORB3A tape record read and stored by DBFOR.

RECORD: A 256-word array containing the data after conversion. Contains a record read from the input ORB3A tape.

256: The number of 7094-form words to be converted.

2: Indicates the type of conversion to be performed (single precision 7094 floating point to double word S/360 floating point).

JERR: Contains a code to indicate a certain error condition. This variable is not used in the TELOR3 program.

1: The number of the 7094-form word which is to be the first to be converted.

3. Calls to DATCON

CALL DATCON (97)

CALL DATCON (JOUTBN, 253)

CALL DATCON (47, RECORD, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECORD, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECRD1, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (47, RECRD1, 253, JOUTBN)

CALL DATCON (JOUTBN, -1)

CALL DATCON (JOUTBN, -2)

The arguments appearing in these calling sequences are defined below.

97: A flag which causes the output ORB3A tape generated by DATCON to have a UNIVAC 1107 type format.

JOUTBN: The FORTRAN logical unit number on which the output ORB3A tape is written.

253: The number of 36-bit words in one record on the output ORB3A tape (253 data words; control words are not counted).

47: Indicates the type of conversion to be performed (double word S/360 floating point to single precision 7094-form floating point).

RECORD: A 256-word array containing the data to be converted. Contains a title record, a data record, or a sentinel item record ready to be written on the output ORB3A tape.

A flag which causes DATCON to write a record on the output ORB3A tape.

RECRD1: A 256-word array containing the data to be converted. Contains a sentinel record ready to be written on the output ORB3A tape.

-2: A flag which causes DATCON to write an end-of-file on the output ORB3A tape.

7.4.2 Functions Called

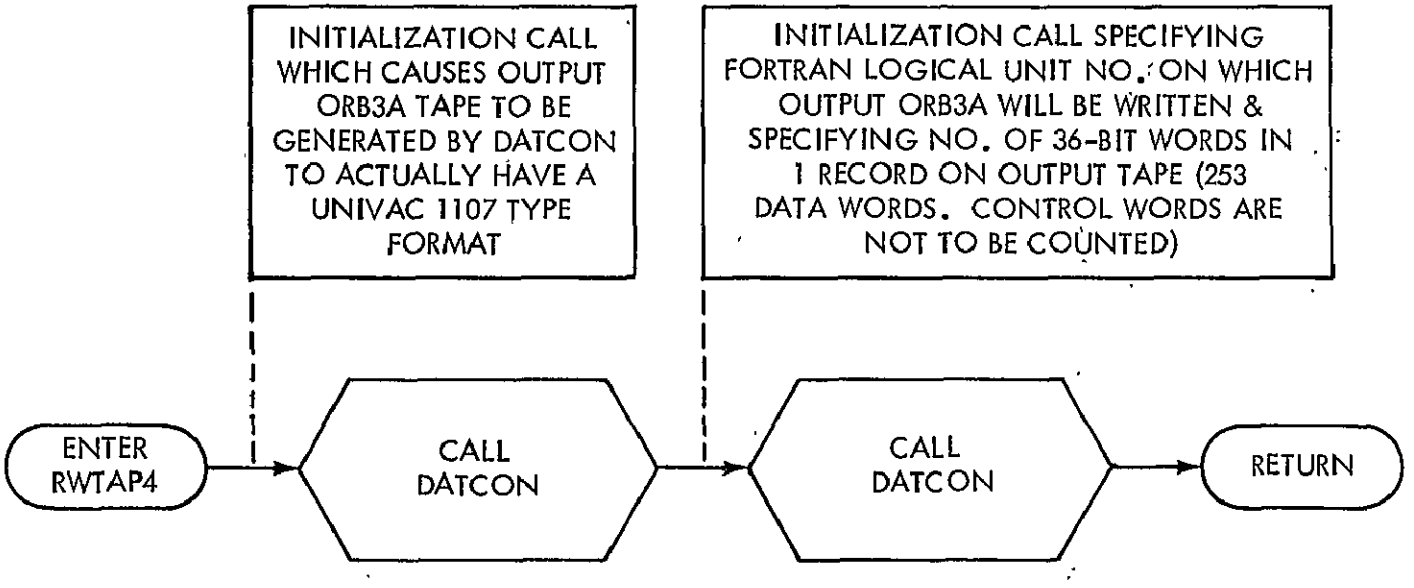
There are no function subprograms called by RWTAP4.

7.5 FLOWCHART

The flowchart for subroutine RWTAP4 appears in Figure 6.

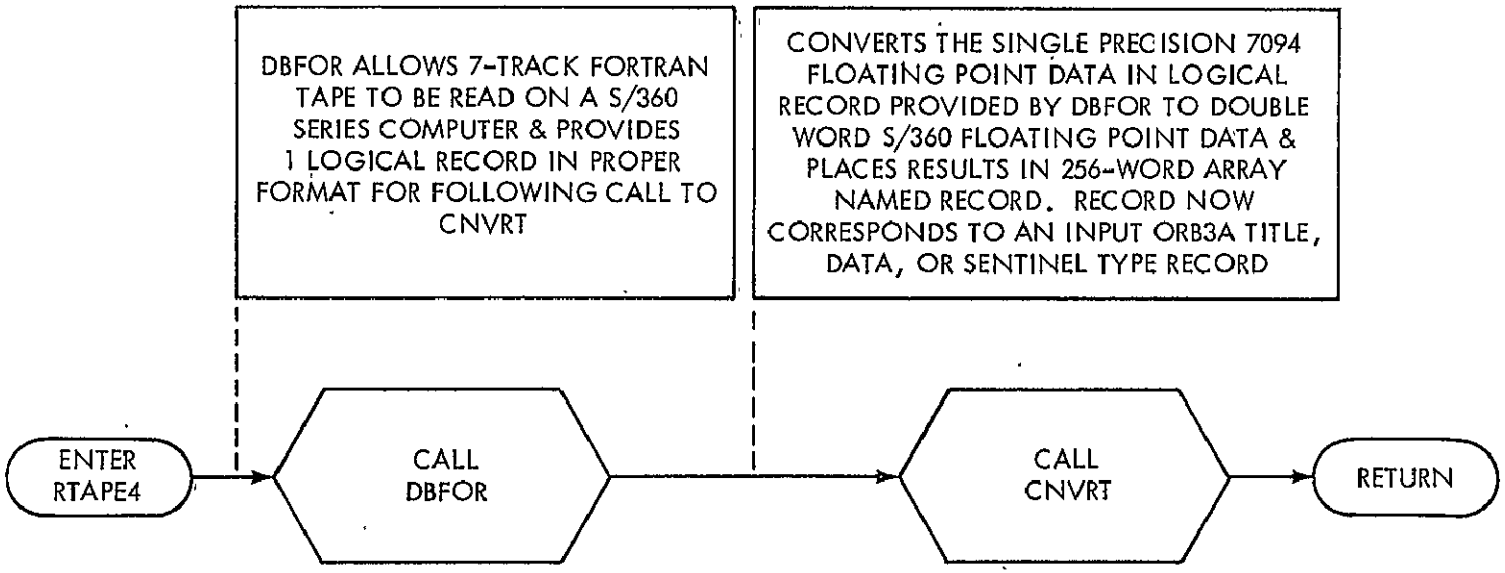
7.6 RESTRICTION

Subroutine RWTAP4 reads and writes only 7-track, binary ORB3A tapes containing single precision floating point data.



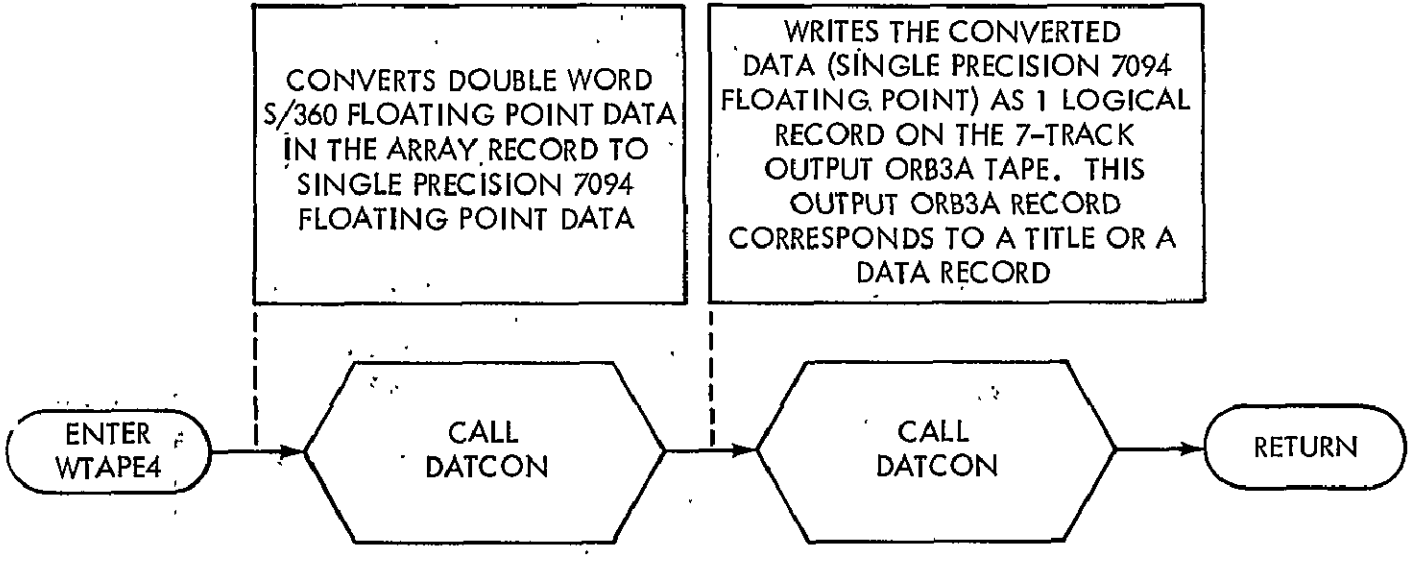
NOTE:
1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

Figure 6 (sheet 1 of 4). Flowchart for Subroutine RWTAP4 (Standard Entry Point) of the S/360 TELOR3 Program



NOTE:
1. DBFOR & CNVRT ARE FORTRAN LIBRARY SUBROUTINES.

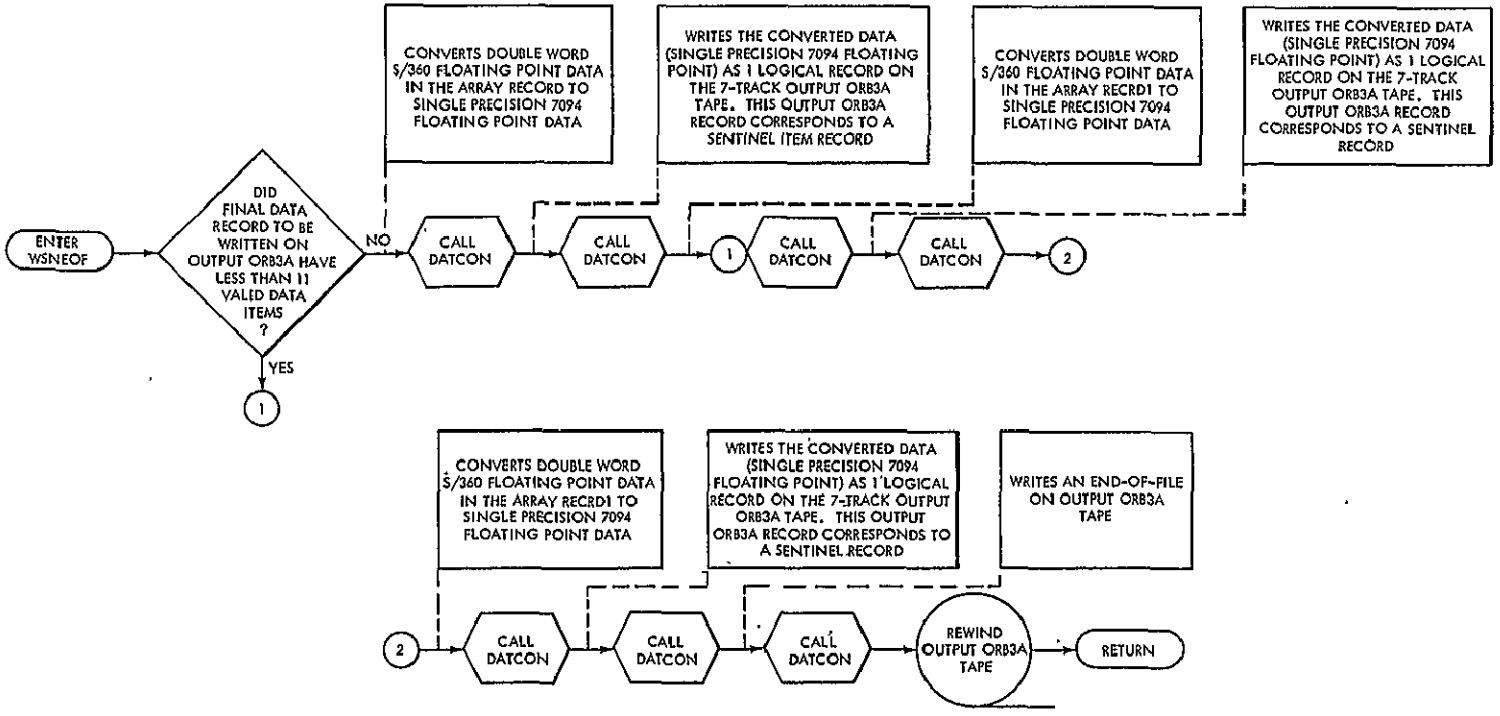
Figure 6 (sheet 2 of 4). Flowchart for Subroutine RWTAP4 (Non-Standard Entry Point RTAPE4) of the S/360 TELOR3 Program



NOTE:

1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

Figure 6 (sheet 3 of 4). Flowchart for Subroutine RWTAP4 (Non-Standard Entry Point WTAPE4) of the S/360 TELOR3 Program



NOTE:
1. DATCON IS A FORTRAN LIBRARY SUBROUTINE MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS.

Figure 6 (sheet 4 of 4). Flowchart for Subroutine RWTAP4 (Non-Standard Entry Point WSNEOF) of the S/360 TELOR3 Program

REFERENCES

1. Orbital Determination Utility Programs - IBM Federal Systems Division, Gaithersburg, Maryland: Contract NAS 5-10022, March 1970 (TELOR3 Program Section).

2. Space and Earth Sciences Computing Center User's Guide - Wolf Research and Development Corporation, Riverdale, Maryland: Contract NAS 5-11735, Mod. 3, Revised May 1, 1970 (DEBLOCK/CNVRT Package, pp 225-226).

3. Registered Computer Program Number A00042 - DATCON: Computer Program Library, Room 25, Bldg. 16A, Goddard Space Flight Center, Greenbelt, Maryland.

APPENDIX A

S/360 TELOR3 PROGRAM USER'S GUIDE

A.1 LANGUAGE AND SYSTEM

The S/360 TELOR3 Program has been compiled under FORTRAN IV, level H, optimization level of zero on the IBM 360/95 using Release 19. No changes are necessary to run this program on the 360/75.

A.2 PROGRAM INPUT

A.2.1 Tape Input

One 7-track,binary ORB3A tape containing single precision floating point data (see Section 7.3.3 for detailed tape format description and Figure A-6 for a numerical example).

A.2.2 Data Card Input

A.2.2.1 Option Card

Format	Columns	Variable	Description
I1		KASE	Used to select TELOR3 option desired (see below).
8X	2-9		Blank
F6.1	10-15	VALUE	Used with Change Pass Numbers and Report Option. A number which is one less than the desired value for the pass no. of the first ascending node crossing data item to be written on the output ORB3A tape.
4X	16-19		Blank

Format	Columns	Variable	Description
A6	20-25	TAPEIN	Input ORB3A tape no. (left adjusted).

KASE = 1, Ascending Node Report Option

KASE = 2, Change Pass Numbers and Report Option

KASE = 3, Select Time Period Option

KASE = 4, Sunlight Report Option

KASE = 5, Check Record Option

A.2.2.2 Select Time Period Card

This card is required when using the Select Time Period Option and contains the requested start and end times of the period of data to be selected from an input, binary ORB3A tape and written on an output, binary ORB3A tape.

Format	Columns	Variable	Description
I6	1-6	IST	Requested START YRMODY of interval of data to be selected, e.g. 710507.
1X	7		Blank
I4	8-11	IHR	Requested START HRMN, e.g. 1758.
1X	12		Blank
I6	13-18	IEN	Requested END YRMODY of interval of data to be selected.
1X	19		Blank
I4	20-23	IEHR	Requested END HRMN

A.3 PROGRAM OUTPUT

A.3.1 Tape Output

Output tape format is identical to the input tape. See Section 7.3.3 for detailed tape format description and Figure A-6 for a numerical example. Program tape output associated with each of the five TELOR3 options is listed below:

1. Ascending Node Report Option:

   None.

2. Change Pass Numbers and Report Option:

   A new 7-track,binary ORB3A tape (single precision floating point) which is a duplicate of the input ORB3A tape with the exception that the output tape contains altered pass numbers.

3. Select Time Period Option:

   A new 7-track,binary ORB3A tape (single precision floating point) containing period of data selected from input ORB3A tape.

4. Sunlight Report Option:

   None

5. Check Record Option:

   A new 7-track,binary ORB3A tape (single precision floating point) with the period of data extending through the next-to-the-last record before the check-fail record.

A.3.2 System Printer Output

1. Ascending Node Report Option:
   Report listing the times of the ascending node crossing numbers (pass numbers) present on the input ORB3A tape and listing the period of time between successive pass numbers.

2. Change Pass Numbers and Report Option:
   An ascending node report based on the output ORB3A tape.

3. Select Time Period Option:
   Summary showing both requested and actual time period selected for output ORB3A tape.

4. Sunlight Report Option:
   Report listing the times of satellite sunlight entrances and exits present on the input ORB3A tape.

5. Check Record Option:
   Summary showing the type of error found in a data record on the input ORB3A tape, a display of the record containing the error, a display of the last data record written on the output ORB3A tape, and a display of the output ORB3A tape title record.

A.4 PROGRAM SCRATCH FILES

If the Select Time Period Option or the Check Record Option has been chosen, the TELOR3 Program uses a scratch file on disk for temporary storage of data records read from the input ORB3A tape. These data records are subsequently read from the scratch file in the process of creating the output ORB3A tape.

A.5 SAMPLE DECK SETUP

A sample deck set up along with a set of notes is shown in Figure A-1 for the Select Time Period Option since this option (as well as the Check Record Option) requires the maximum device configuration used by the TELOR3 Program. It is assumed in this example that a TELOR3 object deck has been made and placed on tape. The object deck includes the system utility routine DATCON which has been modified for TELOR3 Program purposes to omit the complementing of negative numbers when converting data and subsequently writing this data on an output ORB3A tape.

A.6 SAMPLE SYSTEM PRINTER OUTPUTS

Sample run printouts for the five TELOR3 options are presented in Figures A-2 through A-6. A list of option sample printouts and figure numbers appears below:

1. Ascending Node Report Option: Figure A-2
2. Change Pass Numbers and Report Option: Figure A-3
3. Select Time Period Option: Figure A-4
4. Sunlight Report Option: Figure A-5
5. Check Record Option: Figure A-6.

```
//ZBRKS004 JOB (GI0011311F,T,G00409,003003),QQQ,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGO
//TAPELIB DD DSN=TELOR3,VOL=SER=1067H                              A
//LINK.SYSLIN DD *
 INCLUDE TAPELIB
 ENTRY MAIN
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNAME=ORB3A,UNIT=2400-7,                           B
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4568H,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1)
//GO.FT14F001 DD UNIT=DISK,SPACE=(CYL,(30,6)),                     C
// DCB=(RECFM=VS,BLKSIZE=2056)
//GO.FT15F001 DD DSNAME=ORB3OUT,UNIT=2400-7,DISP=(NEW,KEEP),       D
// LABEL=(,BLP),VOLUME=SER=1811M,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GO.DATA5 DD *
3                4568H                                            E
700718 0700 700724 0700                                           F
/*
```

Notes

A. Specifies TELOR3 Object Program tape no. (1067H). Required for all options.

B. Defines input ORB3A tape (4568H). Required for all options.

C. Defines scratch disk space necessary for processing an input ORB3A tape containing approximately one month of data. This scratch disk is required only for the Select Time Period Option and the Check Record Option.

D. Defines output ORB3A tape (1811M). Required for the Change Pass Numbers and Report Option, the Select Time Period Option, and the Check Record Option.

E. Option card. Required for all options. Specifies option desired, input pass number (only needed for Change Pass Numbers and Report Option), and input ORB3A tape number.

F. Select time period card. Required only for Select Time Period Option. Specifies the requested start and end times (YRMODY, HRMN) of the data to be written on the output ORB3A tape.

Figure A-1. TELOR3 Program Sample Deck Setup for the Select Time Period Option

Figure A-2. Ascending Node Report Option Sample Run Printout

```
//ZBRKS001 JOB (GIC)11-3141,T,G004409,001001),000,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGO
XXDEFAULT PROC NBLK=50                                                  00000100
XXLINK    EXEC PGM=IEWL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K         00000200
XXLOADLIB DD   DSNAME=SYS2.LOADLIB,DISP=SHR                             00000300
XXNEWLIN  DD   DUMMY                                                    00000400
XXSYSLIB  DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000500
XX        DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000600
XX        DD DSNAME=SYS1.FORTLIB,DISP=SHR                               00000700
XX        DD DSNAME=SYS2.GSFCLIB,DISP=SHR                               00000800
XX        DD DSNAME=SYS1.PLILIB,DISP=SHR                                00000900
XX        DD DSNAME=SYS1.TELCMLIB,DISP=SHR                              00001000
XX        DD DSNAME=SYS2.LOADLIB,DISP=SHR                               00001100
XX        DD DSNAME=SYS1.SSPAK,DISP=SHR                                 00001200
XXSYSLMOD DD   DSN=&&LOADMOD(GSEC),DISP=(NEW,PASS),UNIT=DISK,           00001300
XX             SPACE=(3072,(&NBLK,40,1))                                00001400
IEF653I SUBSTITUTION JCL - SPACE=(3072,(50,40,1))
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210),         00001500
XX             SPACE=(TRK,(10,5))                                       00001600
XXSYSUT1  DD   UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024         00001700
//TAPELIB DD DSN=TELORB,VOL=SER=1067H
X/TAPELIB  DD  DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP),  00001800
XX             DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)     00001900
//LINK.SYSLIN DD *
X/SYSLIN   DD  DSN=&&OBJMOD,DISP=(OLD,DELETE),DCB=RECFM=FB              00002000
XX             DDNAME=OBJECT                                            00002100
IEF236I ALLOC. FOR Z3RKS001 LINK
IEF237I 547   ALLOCATED TO LOADLIB
IEF237I 547   ALLOCATED TO SYSLIB
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 337   ALLOCATED TO
IEF237I 330   ALLOCATED TO SYSLMOD
IEF237I 330   ALLOCATED TO SYSPRINT
IEF237I 330   ALLOCATED TO SYSUT1
IEF237I 0D4   ALLOCATED TO TAPELIB
IEF237I 232   ALLOCATED TO SYSLIN
```

```
F12B-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED-MAP,LIST
          VARIABLE OPTIONS USED -  SIZE=(307200,12288)-          DEFAULT OPTION(S) USED
IEW0000     INCLUDE TAPELIB
IEW0000     ENTRY MAIN

                                    MODULE MAP

  CONTROL SECTION                          ENTRY
    NAME     ORIGIN   LENGTH                NAME   LOCATION     NAME   LOCATION     NAME   LOCATION     NAME   LOCATION
  MAIN          00      E80
  ASCEND      E80      422
  SELECT      1370      D62
  SUNLGT      2008      108
  CHKREC      3190      C60
  RWTAP4      3DF8      402
                                           RTAPE4    40CC     WTAPE4    4148     WSNEOF    41AC
  DATCON=     4238      F66
                                           DATCON    4238
  CNVHT   *   52D4       D8
  DBFOR   *   52C0      2A7
  FJ6F90=*    5568      20C
                                           FJ6F90    5568
  IHCECOMH*   5828      F41
                                           IBCOM=    5828     FDIOCS=   58E4     INTSWTCH  674E
  IHCCUMH3*   6770       66
                                           SEQDASD   6AE8
  DTI     *   6DD0       F0
  FLT     *   6EC8      230
                                           FSTFS     6EC8     FSTFD     6EEC     FDTFS     6F10     FDTFD     6F34
  FIXFLT  *   7100      151
                                           ITFS      7100     ITFD      7124
  FIX     *   7258      110
                                           ITI       7258
  M       *   7378       D8
  TRANS   *   7450       CA
  IHCFCVTH*   7540      119D
                                           ADCON=    7540     FCVADUTP  75EA     FCVLDUTP  7674     FCVZDUTP  77CA
                                           FCVIOUTP  7878     FCVEOUTP  807A     FCVCOUTP  8294     INT6SWCH  8578
  IHCEFNTH*   8650       61C
                                           ARITH=    86E0     ADJSWTCH  8A4C
  IHCEFIOS*   88F8      1388
                                           FIOCS=    88F8     FIOCSBEP  88FE
  IHCUOPT *   9F60       35C
  CMPRS   *   A2D0      17C
  IHCERRM *   A420       5B6
                                           ERRMON    A420     IHCERRE   A438
  IHCUATBL*   A9E0       638
  IHCETRCH*   B018       28E
                                           IHCTRCH   B018     ERRTRA    B020
  $BLANKCOM   B2A8      1024
```

```
NAME   LOCATION   NAME   LOCATION   NAME   LOCATION   NAME   LOCATION   NAME   LOCATION
ENTRY ADDRESS
TOTAL LENGTH
***DFC  DUMMY RECORD HAS BEEN ADDED TO DATA SET
```

```
IEF285I   SYS2.LOADLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.GSFCLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.PL1LIB                                   KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.TELCMLIB                                 KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.LOADLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.SSPAK                                    KEPT
IEF285I   VOL SER NOS= G15YS2.
IEF286I   SYS71158.T154654.RV000.ZBRKS001.LODMOD        PASSED
IEF285I   VOL SER NOS= G15CRA.
IEF285I   SYS71158.T154554.RV000.ZBRKS001.R0000894      SYSOUT
IEF285I   VOL SER NOS= G15CRA.
IEF285I   SYS71158.T154554.RV000.ZBRKS001.R0000895      DELETED
IEF285I   VOL SER NOS= G15CRA.
IEF285I   TELOR3                                        KEPT
IEF285I   VOL SER NOS= 1057H .
IEF285I   SYS71158.T154554.RV000.ZBRKS001.S0000896      SYSIN
IEF285I   VOL SER NOS= G15CR3.
IEF285I   SYS71158.T154554.RV000.ZBRKS001.S0000896      DELETED
IEF285I   VOL SER NOS= G15CR3.
-------JOB NUM=  013 STEP NUM=  01  ZBRKS001  LINK     PGM=IEWL     CARDS=00002   INITIATION TIME=20.59.32.15 DATE=06.07.71
----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.06        STEP=01  LINK      TERMINATION TIME=21.01.34.68 DATE=06.07.71
-------I/O TIME BY DEVICE.  DISK=*****2.36,DRUM=*******.01,TAPE=*******.08,CELL=*******.00,OTHR=*******.00
----- STEP REGION SIZE=0300K  MAXIMUM REGION SIZE USED=0300K   PERCENT OF REGION USED=99
XXGO      EXEC PGM=*.LINK,SYSLMOD,COND=(5,LT),REGION=100K                    00002300
XXFT05F001 DD  DDNAME=DATAS                                                  00002300
XXFT06F001 DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),              00002400
XX             SPACE=(CYL,(1,1))                                             00002500
XXFT07F001 DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),                   00002600
XX             SPACE=(TRK,(1,20))                                            00002700
*** INSERT  //GO.FT07F001 DD DSN=&&DECK,SYSOUT=B  FOR PUNCHED OUTPUT        00002800
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=125,BLKSIZE=629),               00002900
XX             SPACE=(TRK,(1,20))                                            00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNAME=INJ23A,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4517H,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1)
//GO.DATAS DD *
//
IEF236I ALLOC. FOR ZBRKS001 GO
IEF237I JES2  ALLOCATED TO PGM=*.DD
IEF237I 230   ALLOCATED TO FT05F001
IEF237I 330   ALLOCATED TO FT06F001
IEF237I 332   ALLOCATED TO SYSPRINT
IEF237I JES2  ALLOCATED TO SYSUDUMP
IEF237I 0D0   ALLOCATED TO FORTAP
```

S/360 TELORB PROGRAM(TEST,EDIT,AND LIST ORBJA TAPE)

INPUT ORB3A TAPE NO. IS 4517H SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 67731

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	681130	0	4	59
INPUT ORB3A SATELLITE DATA END TIME	681203	2	4	59

ASCENDING NODE REPORT OPTION CHOSEN FOR THIS RUN

PASS NO.	ASCENDING NODE					PERIOD
	DATE	DAY OF YR	HR	MIN	SEC	MINUTES
7245	681130	335	0	28	27	0.0
7246	681130	335	2	5	31	97.08
7247	681130	335	3	42	36	97.07
7248	681130	335	5	19	40	97.07
7249	681130	335	6	56	45	97.07
7250	681130	335	8	33	49	97.07
7251	681130	335	10	10	53	97.07
7252	681130	335	11	47	58	97.07
7253	681130	335	13	25	2	97.08
7254	681130	335	15	2	7	97.08
7255	681130	335	16	39	11	97.07
7256	681130	335	18	16	16	97.07
7257	681130	335	19	53	20	97.07
7258	681130	335	21	30	24	97.07
7259	681130	335	23	7	29	97.07
7260	681201	336	0	44	33	97.08
7261	681201	336	2	21	38	97.08
7262	681201	336	3	58	42	97.07
7263	681201	336	5	35	47	97.07
7264	681201	336	7	12	51	97.07
7265	681201	336	8	49	55	97.07
7266	681201	336	10	27	0	97.07
7267	681201	336	12	4	4	97.07
7268	681201	336	13	41	8	97.07
7269	681201	336	15	18	13	97.07
7270	681201	336	16	55	17	97.07
7271	681201	336	18	32	21	97.07
7272	681201	336	20	9	26	97.07
7273	681201	336	21	46	30	97.07
7274	681201	336	23	23	34	97.07
7275	681202	337	1	0	39	97.07
7276	681202	337	2	37	43	97.07
7277	681202	337	4	14	48	97.07
7278	681202	337	5	51	52	97.07
7279	681202	337	7	28	56	97.07
7280	681202	337	9	6	0	97.07
7281	681202	337	10	43	5	97.07
7282	681202	337	12	20	9	97.07
7283	681202	337	13	57	13	97.07
7284	681202	337	15	34	18	97.07
7285	681202	337	17	11	22	97.07
7286	681202	337	18	48	26	97.07
7287	681202	337	20	25	30	97.07
7288	681202	337	22	2	34	97.07

PASS NO.	ASCENDING NODE					PERIOD
	DATE	DAY OF YR	HR	MIN	SEC	MINUTES
7289	681202	337	23	39	39	97.07
7290	681203	338	1	16	43	97.07

NORMAL TERMINATION OF ASCENDING NODE REPORT OPTION.

```
IEF285I   SYS71153.T154554.RV000.ZBRKS001.LODMOD          PASSED
IEF285I      VOL SER NOS= G1>CRA.
IEF285I   SYS71153.T154554.RV000.ZBRKS001.S0000900        SYSIN
IEF285I      VOL SER NOS= G1>CR1.
IEF285I   SYS71158.T154554.RV000.ZBRKS001.S0000900        DELETED
IEF285I      VOL SER NOS= G1>CR1.
IEF285I   SYS71153.T154554.RV000.ZBRKS001.R0000897        SYSOUT
IEF285I      VOL SER NOS= G1>CRA.
IEF285I   SYS71158.T154554.SV000.ZBRKS001.R0000898        DELETED
IEF285I      VOL SER NOS= G1>CR9.
IEF285I   SYS71158.T154554.SV000.ZBRKS001.R0000899        DELETED
IEF285I      VOL SER NOS= G1>CRA.
IEF285I   INDRJA                                          KEPT
IEF285I      VOL SER NOS= 4517H .
IEF286I JOB NBR=0133 STEP NBR=02 ZBRKS001 GO . . PGM=PGM=*.DD. CARDS=00001 INITIATION TIME=21.01.35.08 DATE=06-07-71
      ----- CPU=000.1 I/O=000.1 CORE=0000.1  CHARGE=000.09        STEP=02  GO        TERMINATION TIME=21.02.28.90 DATE=06-07-71
      ----- I/O TIME BY DEVICE.  DISK=******.18,DRUM=******.03,TAPE=*****2.13,CEL_=******.00,OTHR=******.00
      ----- STEP REGION SIZE=0100K  MAXIMUM REGION SIZE USED=0084K  PERCENT OF REGION USED=84
IEF285I   SYS71158.T154554.RV000.ZBRKS001.LODMOD          DELETED
IEF285I      VOL SER NOS= G1>CRA.

      ----- CPU=000.1 I/O=000.1 GDRS=000.1  CHARGE=000.15    JOB NBR=0133 ZBRKS001  360/95      SYSTEM=MVT-19.6  01=16=71  G1
      ----- I/O TIME BY DEVICE.  DISK=*****2.54,DRUM=******.01,TAPE=*****2.21,CEL_=******.00,OTHR=******.00
```

Figure A-3. Change Pass Numbers and Report Option Sample Run Printout

```
//ZERKSCIS JOB (G1C,113IF,T,6,5+6,),1501),CGG,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGO
XXDEFALLT PROC MBLK=6)                                                  00000100
XXLINK    EXEC PGM=IEWL,PARM='MAP,LIST'),COND=(5,LT),REGION=300K        00000200
XXLLALLIB  DD  DSNAME=SYS2.LLALLIB,DISP=SHR                             00000300
XXNCALIN   DD  DUMMY                                                    00000400
XXSYSLIB   DD  DSNAME=SYS2.DUMMY,DISP=SHR                               00000500
XX         DD  DSNAME=SYS2.DUMMY,DISP=SHR                               00000600
XX         DD  DSNAME=SYS1.FGATLIB,DISP=SHR                             00000700
XX         DD  DSNAME=SYS2.CSFCLIB,DISP=SHR                             00000800
XX         DD  DSNAME=SYS1.PLILIB,DISP=SHR                              00000900
XX         DD  DSNAME=SYS1.ILLCMLIB,DISP=SHR                            00001000
XX         DD  DSNAME=SYS2.LU4LLIB,DISP=SHR                             00001100
XX         DD  DSNAME=SYS1.SUPAK,DISP=SHR                               00001200
XXSYSLMOD  DD   DSN=&&LLBMOD(GSFC),DISP=(NEW,PASS),UNIT=DISK,           00001300
XX              SPACE=(3072,(&NBLK,40,1))                               00001400
IEFC661I SUBSTITUTION JCL - SPACE=(3072,(6,40,1))
XXSYSPRINT DD   SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1213),        00001500
XX              SPACE=(TRK,(15,5))                                      00001600
XXSYSUT1   DD   UNIT=DISK,SPACE=(1024,(10,20)),DCB=BLKSIZE=1024         00001700
//TAPELIB DD DSN=TELCOM,VOL=SER=1067H
XXTAPELIB  DD   DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP), 00001800
XX              DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)    00001900
//LINK.SYSLIN DD *
XXSYSLIN   DD   DSN=&&GOMOD,DISP=(OLD,DELETE),DCB=RECFM=FB              00002000
XX         DD   DDNAME=LLOBJCT                                          00002100
IEF236I ALLOC. FOR ZERKS603 LINK
IEF237I 547  ALLOCATED TO LLALLIB
IEF237I 547  ALLOCATED TO SYSLIB
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 547  ALLOCATED TO
IEF237I 301  ALLOCATED TO SYSLMOD
IEF237I 00C  ALLOCATED TO SYSPRINT
IEF237I 001  ALLOCATED TO SYSUT1
IEF237I 502  ALLOCATED TO TAPELIB
IEF237I 541  ALLOCATED TO SYSLIN
```

```
FIZ0-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP,LIST
          VARIABLE OPTIONS USED -  SIZE=(307200,122880)-          DEFAULT OPTION(S) USED
IEW9000     INCLUDE TAPE1B
IEW9000     ENTRY MAIN
```

MODULE MAP

CONTROL SECTION

NAME	ORIGIN	LENGTH
MAIN	00	0E0
ASCEND	0E8	4B2
SELECT	139C	D02
SORLCT	2CDC	1CB8
CHKREC	3196	C00
RWTAP4	2DF8	4C8
DATCON=	42B8	FC0
CNVRT *	52D8	B8
DBFUN *	52CC	2A7
F30F90= *	5E6E	2B0
IHCBLCMN*	5B2B	F41
IHCLCMP2*	6770	6B0
UTI *	6DDC	F5
FLT *	6BC8	2B8
FIXFLT *	7100	151
FIX *	7258	110
M *	737C	D8
TRANS *	7460	BA
IHCFCVTH*	7540	1190
IHCEFNTH*	8B0C	512
IHCEFIOS*	8BF8	1308
IHCUOPT *	9F08	350
CMPRS *	A2E0	170
IHCERRM *	A420	5EC
IHCUATBL*	A9E0	638
IHCETRCH*	B018	28C
$$BLANKCOM	B2A8	1024

ENTRY

NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
RTAPE4	40CC	WTAPE4	4148	WSNEOF	41AC		
DATCON	4238						
F30F90	55D8						
IBCOM=	5828	FDIOCS=	58E4	INTSWTCH	674E		
SEQDASD	6AE8						
FSTFS	6BC8	FSTF0	6BFC	FDTFS	6F10	FDTF0	6F34
ITFS	7100	ITF0	7124				
ITI	7258						
ADCON=	7540	FCVADUTP	75EA	FCVLOUTP	767A	FCVZOUTP	77CA
FCVIOUTP	7878	FCVEOUTP	897A	FCVCOUTP	8294	INT6SWCH	8578
ARITH=	8020	ADJSWTCH	8A4C				
FIOCS=	88F8	FIOCSBEP	8BFE				
ERRMON	A420	IHCERRE	A438				
IHCTRCH	B018	ERRTRA	B020				

```
   NAME     ORIGIN  LENGTH                  NAME    LOCATION    NAME    LOCATION    NAME    LOCATION    NAME    LOCATION

ENTRY ADDRESS       .0.
TOTAL LENGTH        C2D0

****CSFC       DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
```

```
IEF285I   SYS2.LOADLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS1.PORTLIB                                  KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS2.GSPCLIB                                  KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS1.PL1LIB                                   KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS1.TELCMLIB                                 KEPT
IEF285I   VOL SER NOS= C1SYS1.
IEF285I   SYS2.LCALLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.SSPAK                                    KEPT
IEF285I   VOL SER NOS= C1SYS2.
IEF285I   SYS71159.T231042.RV000.ZERKS003.LODMOD        PASSED
IEF285I   VOL SER NOS= C1SCR5.
IEF285I   SYS71159.T231042.RV000.ZERKS003.R0000188      SYSOUT
IEF285I   VOL SER NOS= G1SCR5.
IEF285I   SYS71159.T231042.RV000.ZERKS003.R0000189      DELETED
IEF285I   VOL SER NOS= G1SCR5.
IEF285I   TELCMS                                        KEPT
IEF285I   VOL SER NOS= 1C27M .
IEF285I   SYS71159.T231042.RV000.ZERKS003.S0000190      SYSIN
IEF285I   VOL SER NOS= C1SCR5.
IEF285I   SYS71159.T231042.RV000.ZERKS003.S0000196      DELETED
IEF285I   VOL SER NOS= C1SCR5.
-----JOB NAME-  ZERKS003  STEP NAME= 01  ZERKS003  LINK      PGM=IEWL      CARDS=000012   INITIATION TIME=23.59.43.70 DATE=06-19-71
----- CPU=000:00.1 I/O=000:00.1 CORE=0000.1  CHARGE=000.00          STEP=01  LINK      TERMINATION TIME=00.03.10.75 DATE=06-19-71
----- I/O TIME BY DEVICE.  DISK=*****2.36,DRUM=******.00,TAPE=******.00,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=92000K  MAXIMUM REGION SIZE USED=91000K   PERCENT OF REGION USED=99
XAGO      EXEC PGM=*.LINK.SYSLMOD,COND=(8,LT),REGION=100K                    00002200
XXFT05F001 DD  DDNAME=DATA5                                                  00002300
XXFT06F001 DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),              00002400
XX             SPACE=(CYL,(1,1))                                             00002500
XXFT07F001 DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),                   00002600
XX             SPACE=(TRK,(1,2))                                             00002700
***  INSERT   //GO.FT07F001 DD DSN=&&DECK,SYSOUT=B   FOR PUNCHED OUTPUT      00002800
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=125,BLKSIZE=629),               00002900
XX             SPACE=(TRK,(1,2))                                             00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNAME=INCRSA,UNIT=2400-7,
// LABEL=(,SLP),DISP=(OLD,KEEP),VOLUME=SER=4517H,
// DCB=(LRECL=1542,BLKSIZE=1542,BLN=1)
//GO.FT15F001 DD DSNAME=CRJOUT,UNIT=2400-7,DISP=(NEW,KEEP),
// LABEL=(,SLP),VOLUME=SER=3239H,
// DCB=(RECFM=F,LRECL=1,BLKSIZE=1536)
//GO.DATA5 DD *
//
IEF236I ALLOC. FOR ZERKS003 GO
IEF237I 331   ALLOCATED TO PGM=*.DD
IEF237I 230   ALLOCATED TO FT15F001
IEF237I 541   ALLOCATED TO FT06F001
IEF237I 543   ALLOCATED TO SYSPRINT
IEF237I 001   ALLOCATED TO SYSUDUMP
IEF237I 001   ALLOCATED TO FORTAP
IEF237I 001   ALLOCATED TO FT05F001
```

```
S/SC.  TELCR3 PROGRAM(TEST,EDIT,AND LIST CRB3A TAPE)

INPUT CRC3A TAPE NO. IS 4617H   SATELLITE ID ON INPUT CRB3A TITLE RECORD IS   67731

                                          DATE    HR   MIN  SEC
INPUT CRB3A SATELLITE DATA START TIME   681130     0    4   59
INPUT CRB3A SATELLITE DATA END TIME     681203     2    4   59

CHANGE PASS NUMBERS AND REPORT OPTION CHOSEN FOR THIS RUN
```

PASS NO.	ASCENDING NODE DATE	DAY OF YR	HR	MIN	SEC	PERIOD MINUTES
2	681130	335	0	28	27	0.0
3	681130	335	2	5	31	97.08
4	681130	335	3	42	36	97.07
5	681130	335	5	19	40	97.07
6	681130	335	6	56	45	97.07
7	681130	335	8	33	49	97.07
8	681130	335	10	10	53	97.07
9	681130	335	11	47	58	97.07
10	681130	335	13	25	2	97.08
11	681130	335	15	2	7	97.08
12	681130	335	16	39	11	97.07
13	681130	335	18	16	16	97.07
14	681130	335	19	53	20	97.07
15	681130	335	21	30	24	97.07
16	681130	335	23	7	29	97.07
17	681201	336	0	44	33	97.08
18	681201	336	2	21	38	97.08
19	681201	336	3	58	42	97.07
20	681201	336	5	35	47	97.07
21	681201	336	7	12	51	97.07
22	681201	336	8	49	55	97.07
23	681201	336	10	27	0	97.07
24	681201	336	12	4	4	97.07
25	681201	336	13	41	8	97.07
26	681201	336	15	18	13	97.07
27	681201	336	16	55	17	97.07
28	681201	336	18	32	21	97.07
29	681201	336	20	9	26	97.07
30	681201	336	21	46	30	97.07
31	681201	336	23	23	34	97.07
32	681202	337	1	0	39	97.07
33	681202	337	2	37	43	97.07
34	681202	337	4	14	48	97.07
35	681202	337	5	51	52	97.07
36	681202	337	7	28	56	97.07
37	681202	337	9	6	0	97.07
38	681202	337	10	43	5	97.07
39	681202	337	12	20	9	97.07
40	681202	337	13	57	13	97.07
41	681202	337	15	34	18	97.07
42	681202	337	17	11	22	97.07
43	681202	337	18	48	26	97.07
44	681202	337	20	25	30	97.07
45	681202	337	22	2	34	97.07

PASS No.	ASCENDING NODE					PERIOD
	DATE	DAY OF YR	HR	MIN	SEC	MINUTES
46	681202	337	23	39	39	97.07
47	681203	338	1	16	43	97.07

NORMAL TERMINATION OF CHANGE PASS NUMBERS AND REPORT OPTION.

```
IEF285I   SYS71159.T231642.RV000.ZBRKS003.LODMOD        PASSED
IEF285I   VOL SER NOS= C1SCR6.
IEF285I   SYS71159.T231642.RV000.ZBRKS003.S0000194      SYSIN
IEF285I   VOL SER NOS= G1SCR1.
IEF285I   SYS71159.T231642.RV000.ZBRKS003.S0000194      DELETED
IEF285I   VOL SER NOS= C1SCR1.
IEF285I   SYS71159.T231642.SV000.ZBRKS003.R0000191      SYSOUT
IEF285I   VOL SER NOS= C1SCR5.
IEF285I   SYS71159.T231642.SV000.ZBRKS003.R0000192      DELETED
IEF285I   VOL SER NOS= G1SCR7.
IEF285I   SYS71159.T231642.SV000.ZBRKS003.R0000193      DELETED
IEF285I   VOL SER NOS= G1SCR6.
IEF285I   INCRDA                                        KEPT
IEF285I   VOL SER NOS= 4617F .
IEF285I   LN3CLT                                        KEPT
IEF285I   VOL SER NOS= 3239H .
-----JOB NBR=  809 STEP NBR= 02  ZBRKS003  GO    .   PGM=PGM=*.DD CARDS=00001   INITIATION TIME=00.03.11.26 DATE=06-09-71
----- CPU=000.2 I/O=000.1 CORE=000.1  CHARGE=000.25         STEP=02  GO         TERMINATION TIME=00.10.10.95 DATE=06-09-71
----- I/O TIME BY DEVICE.  DISK=******.21,DRUM=******.00,TAPE=*****4.30,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=1160K  MAXIMUM REGION SIZE USED=0990K   PERCENT OF REGION USED=90
IEF285I   SYS71159.T231642.RV000.ZBRKS003.LODMOD        DELETED
IEF285I   VOL SER NOS= C1SCR8.


----- CPU=000.2 I/O=000.1 CORE=000.1  CHARGE=000.31    JOB NBR=819  ZBRKS003  360/95      SYSTEM=MVT-19.6   71-16-71 G1
----- I/O TIME BY DEVICE.  DISK=*****2.58,DRUM=******.00,TAPE=*****4.38,CELL=******.00,OTHR=******.00
```

Figure A-4. Select Time Period Option Sample Run Printout

```
//ZERKS004 JOB (GT0011311F,1,GCC4CS,0003003),CCC,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGO
XXDEFAULT PROC NBLK=50                                                  00000100
XXLINK    EXEC PGM=IEWL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K         00000200
XXLOADLIB DD   DSNAME=SYS2.LOADLIB,DISP=SHR                             00000300
XXNEWLIN  DD   DUMMY                                                    00000400
XXSYSLIB  DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000500
XX        DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000600
XX        DD DSNAME=SYS1.FORTLIB,DISP=SHR                               00000700
XX        DD DSNAME=SYS2.GSFCLIB,DISP=SHR                               00000800
XX        DD DSNAME=SYS1.PLILIB,DISP=SHR                                00000900
XX        DD DSNAME=SYS1.TELCMLIB,DISP=SHR                              00001000
XX        DD DSNAME=SYS2.LOADLIB,DISP=SHR                               00001100
XX        DD DSNAME=SYS1.SSPAK,DISP=SHR                                 00001200
XXSYSLMOD DD   DSN=&&LOADMOD(GSFC),DISP=(NEW,PASS),UNIT=DISK,           00001300
XX             SPACE=(3072,(&NBLK,40,1)),                               00001400
IEFC331 SUBSTITUTION JCL - SPACE=(3072,(50,40,1))
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210),         00001500
XX             SPACE=(TRK,(10,5))                                       00001600
XXSYSUT1  DD   UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024         00001700
//TAPELIB DD DSN=TELCM3,VOL=SER=1067H
X/TAPELIB  DD  DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP),  00001800
XX             DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)     00001900
//LINK.SYSLIN DD *
X/SYSLIN   DD  DSN=&&OBJMOD,DISP=(OLD,DELETE),DCB=RECFM=FB              00002000
XX         DD  DDNAME=OBJECT                                            00002100
IEF236I ALLOC. FOR ZERKS004 LINK
IEF237I 547   ALLOCATED TO LOADLIB
IEF237I 547   ALLOCATED TO SYSLIB
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 337   ALLOCATED TO
IEF237I 332   ALLOCATED TO SYSLMOD
IEF237I 332   ALLOCATED TO SYSPRINT
IEF237I 332   ALLOCATED TO SYSUT1
IEF237I 0D2   ALLOCATED TO TAPELIB
IEF237I 231   ALLOCATED TO SYSLIN
```

```
F12B-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP,LIST
          VARIABLE OPTIONS USED -  SIZE=(307200,12288)-          DEFAULT OPTION(S) USED
IEW0000   INCLUDE TAPELIB
IEW0000   ENTRY MAIN


                                    MODULE MAP

   CONTROL SECTION                                ENTRY

    NAME     ORIGIN   LENGTH          NAME   LOCATION      NAME   LOCATION      NAME   LOCATION      NAME   LOCATION

    MAIN       00      E66
    ASGEND     E68     4E2
    SELECT    1370     D62
    SUNLGT    2008     1CF6
    CHKREC    3190     CB6
    SYTAPE    3DF8     43E
                                    RTAPE4   40CC    WTAPE4   4148    WSNEOF   41AC
    DATCON=   4238     1CC
                                    DATCON   4238
    ENVST   *  5208     D8
    DSFOR   *  52C0     2A7
    F36F90=    5568     20C
                                    F36F90   5568
    IHCECOIN*  5928     1F41
                                    IOCOM=   5628    FDICCS=  58E4    INTSWTCH 674E
    IHCCOMM2*  6770     C5D
                                    SEQ4SD   5AE8
    DTI     *  6DD0     F5
    FLT     *  6EC8     235
                                    FSTFS    6FC8    FSTFD    6EEC    FDTFS    6F10    FDTFD    6F34
    FIXFLT  *  7100     151
                                    ITFS     7100    ITFD     7124
    FIX     *  7253     11D
                                    ITI      7296
    M       *  7378     D8
    TRANS   *  7450     EA
    IHCFCVTH*  7540     119D
                                    ADCON=   7540    FCVADUTP 75CA    FCVLOUTP 767A    FCVZOUTP 77CA
                                    FCVIOUTP 7878    FCVEOUTP 807A    FCVCOUTP 8294    INTOSWCH 8578
    IHCEPNTH*  7EC0     C12
                                    ARITH=   80E0    ADJSWTCH 8A4C
    IHCDFIOS*  88F8     1368
                                    FIOCS=   88FC    FIOCSEP  88FC
    IHCOOPT *  9F50     350
    CMPRS   *  A2B0     170
    IHCERRM *  A420     5EC
                                    ERRMON   A420    IHCERRB  A438
    IHCUATBL*  A9E0     63E
    IHCBTRCH*  B019     2CC
                                    IHCTRCH  B018    ERRTRA   E020
   $BLANKCOM   B2A8     102-
```

```
   NAME     ORIGIN   LENGTH                  NAME     LOCATION     NAME     LOCATION     NAME     LOCATION     NAME     LOCATION

 ENTRY ADDRESS         CC
 TOTAL LENGTH          C2DC

****CSPC        DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
```

```
IEF285I   SYS2.SASLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.DUMMY                                   KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.DUMMY                                   KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.FORTLIB                                 KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.GSPCLIB                                 KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.PLILIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.TELCMLIB                                KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.SASLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.SSPAK                                   KEPT
IEF285I   VOL SER NOS= G1SYS2.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.LODMOD       PASSED
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.R0000264     SYSOUT
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.R0000265     DELETED
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   TELCR3                                       KEPT
IEF285I   VOL SER NOS= 1067H .
IEF285I   SYS71159.T064321.RV000.ZBRKS004.S0000266     SYSIN
IEF285I   VOL SER NOS= G1SCR2.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.S0000266     DELETED
IEF285I   VOL SER NOS= G1SCR2.
-----JOB NBR   776 STEP NBR= 01  ZBRKS004   LINK      PGM=IEWL     CARDS=00002   INITIATION TIME=21.58.36.36 DATE=06-08-71
----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.06        STEP=01  LINK      TERMINATION TIME=22.03.00.30 DATE=06-08-71
------I/O TIME BY DEVICE.  DISK=*****2.36,DRUM=******.00,TAPE=******.00,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=0300K  MAXIMUM REGION SIZE USED=0300K   PERCENT OF REGION USED=99
XXGO      EXEC PGM=*.LINK,SYSLMOD,COND=(5,LT),REGION=100K                    00002200
XXFT05F001 DD  DDNAME=DATA5                                                  00002300
XXFT06F001 DD  SYSOUT=A,DCB=(RECFM=V3A,LRECL=137,BLKSIZE=7265),              00002400
XX             SPACE=(CYL,(1,1))                                             00002500
XXFT07F001 DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),                   00002600
XX             SPACE=(TRK,(1,20))                                            00002700
***  INSERT    //GO.FT07F001 DD DSN=&&DECK,SYSOUT=B   FOR PUNCHED OUTPUT     00002800
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=V8A,LRECL=125,BLKSIZE=629),               00002900
XX             SPACE=(TRK,(1,20))                                            00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNAME=INOR3A,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4568H,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1),
//GO.FT14F001 DD UNIT=DISK,SPACE=(CYL,(30,6)),
// DCB=(RECFM=VS,BLKSIZE=2056)
//GO.FT15F001 DD DSNAME=OR3OUT,UNIT=2400-7,DISP=(NEW,KEEP),
// LABEL=(,BLP),VOLUME=SER=1811M,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GO.DATA5 DD *
//
IEF236I ALLOC. FOR ZBRKS004 GO
IEF237I 332   ALLOCATED TO PGM=*.DD
IEF237I 541   ALLOCATED TO FT05F001
IEF237I 541   ALLOCATED TO FT06F001
IEF237I 332   ALLOCATED TO SYSPRINT
IEF237I 542   ALLOCATED TO SYSUDUMP
IEF237I 600   ALLOCATED TO FORTAP
IEF237I 543   ALLOCATED TO FT14F001
IEF237I 001   ALLOCATED TO FT15F001
```

```
S/360 TELOR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TAPE)

INPUT ORB3A TAPE NO. IS 4568H   SATELLITE ID ON INPUT ORB3A TITLE RECORD IS   69531

                                          DATE   HR  MIN  SEC
INPUT ORB3A SATELLITE DATA START TIME   700718    6.  22    0
INPUT ORB3A SATELLITE DATA END TIME     700820   21.  49.  59

SELECT TIME PERIOD OPTION CHOSEN FOR THIS RUN

                                        START TIME          END TIME
REQUESTED TIME PERIOD SELECTED          DATE  SEC OF DAY  DATE  SEC OF DAY
FOR OUTPUT ORB3A TAPE.                700718  25200.      700724  25200.

ENTIRE REQUESTED TIME PERIOD SELECTED EXISTS ON INPUT ORB3A TAPE.
OUTPUT ORB3A TAPE HAS BEEN GENERATED.

                                        START TIME          END TIME
ACTUAL TIME PERIOD SELECTED             DATE  SEC OF DAY  DATE  SEC OF DAY
FOR OUTPUT ORB3A TAPE.                700718.  24900.      700724.  25800.

NORMAL TERMINATION OF SELECT TIME PERIOD OPTION.
```

```
IEF285I   SYS71159.T064321.RV000.ZBRKS004.LOBMCB        PASSED
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.S0000271      SYSIN
IEF285I   VOL SER NOS= G1SCR5.
IEF285I   SYS71159.T064321.RV000.ZBRKS004.S0000271      DELETED
IEF285I   VOL SER NOS= G1SCR5.
IEF285I   SYS71159.T064321.SV000.ZBRKS004.R0000267      SYSOUT
IEF285I   VOL SER NOS= G1SCR5.
IEF285I   SYS71159.T064321.SV000.ZBRKS004.R0000268      DELETED
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   SYS71159.T064321.SV000.ZBRKS004.R0000269      DELETED
IEF285I   VOL SER NOS= G1SCR6.
IEF285I   INORJA                                        KEPT
IEF285I   VOL SER NOS= 4566H .
IEF285I   SYS71159.T064321.RV000.ZBRKS004.R0000270      DELETED
IEF285I   VOL SER NOS= G1SCR7.
IEF285I   OR30UT                                        KEPT
IEF285I   VOL SER NOS= 1811M .
-----JOB NBR=  776 STEP NBR= 02  ZBRKS004  GO       PGM=PGM=*.DD CARDS=00002   INITIATION TIME=22.03.01.05 DATE=06-08-71
----- CPU=000.5 I/O=001.3 CORE=000.2  CHARGE=001.84        STEP-02  GO        TERMINATION TIME=22.10.41.18 DATE=06-08-71
----- I/O TIME BY DEVICE.  DISK=****54.64,DRUM=******.00,TAPE=****26.08,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=0100K  MAXIMUM REGION SIZE USED=0096K   PERCENT OF REGION USED=96
IEF285I   SYS71159.T064321.RV000.ZBRKS004.LOBMCD        DELETED
IEF285I   VOL SER NOS= G1SCR9.


----- CPU=000.3 I/O=001.4 CORE=000.2  CHARGE=001.90    JOB NBR=776  ZBRKS004  360795      SYSTEM=MVT-19.6   01-16-71  GI
----- I/O TIME BY DEVICE.  DISK=****37.01,DRUM=******.00,TAPE=****26.16,CELL=******.00,OTHR=******.00
```

Figure A-5. Sunlight Report Option Sample Run Printout

```
//ZBRKS002 JOB (CI00113115,T,CCCAC9,001001),CCC,MSGLEVEL=1,TYPRUN=HOLC
// EXEC LINKGC
XXDEFAULT PROC NBLK=50                                                  00000100
XXLINK    EXEC PGM=IEWL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K         00000200
XXLOADLIB DD   DSNAME=SYS2.LOADLIB,DISP=SHR                             00000300
XXNEWLIN  DD   DUMMY                                                    00000400
XXSYSLIB  DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000500
XX        DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000600
XX        DD DSNAME=SYS1.COBTLIB,DISP=SHR                               00000700
XX        DD DSNAME=SYS2.GSPGLIB,DISP=SHR                               00000800
XX        DD DSNAME=SYS1.PLILIB,DISP=SHR                                00000900
XX        DD DSNAME=SYS1.TELCMLIB,DISP=SHR                              00001000
XX        DD DSNAME=SYS2.LOADLIB,DISP=SHR                               00001100
XX        DD DSNAME=SYS1.SSPAK,DISP=SHR                                 00001200
XXSYSLMOD DD  DSN=&&LOADMOD(GSPG),DISP=(NEW,PASS),UNIT=DISK,            00001300
XX            SPACE=(3072,(&NBLK,40,1))                                 00001400
IEF653I SUBSTITUTION JCL - SPACE=(3072,(50,40,1))
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210),         00001500
XX             SPACE=(TRK,(10,5))                                       00001600
XXSYSUT1   DD  UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024         00001700
//TAPELIB DD DSN=TELOR3,VOL=SER=1067H
X/TAPELIB  DD  DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP),  00001800
XX             DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)     00001900
//LINK.SYSLIN DD *
X/SYSLIN   DD  DSN=&&OBJMOD,DISP=(OLD,DELETE),DCB=RECFM=FB              00002000
XX         DD  DDNAME=OBJECT                                            00002100
IEF236I ALLOC. FOR ZBRKS002 LINK
IEF237I 527   ALLOCATED TO LOADLIB
IEF237I 547   ALLOCATED TO SYSLIB
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 547   ALLOCATED TO
IEF237I 337   ALLOCATED TO
IEF237I 332   ALLOCATED TO SYSLMOD
IEF237I 332   ALLOCATED TO SYSPRINT
IEF237I 332   ALLOCATED TO SYSUT1
IEF237I 0C2   ALLOCATED TO TAPELIB
IEF237I 230   ALLOCATED TO SYSLIN
```

```
F12S-LEVEL 1 LINKAGE EDITOR OPTIONS SPECIFIED- MAP,LIST
          VARIABLE OPTIONS USED -  SIZE=(307200,12288)-          DEFAULT OPTION(S) USED
IEW0000   INCLUDE TAPELIB
IEW0000   ENTRY MAIN


                                        MODULE MAP

  CONTROL SECTION                                ENTRY
    NAME      ORIGIN   LENGTH      NAME   LOCATION      NAME   LOCATION      NAME   LOCATION      NAME   LOCATION
  MAIN           CC      E06
  ASCEND       588      4F2
  SELECT       137C      C52
  SUNLST       2CC8     10B6
  CHKREC       219C      C66
  RWTAPE       3DFE      43F
                                 RTAPE4    40CC   WTAPE4    4148   WSNEOF    41AC
  DATCON=      4238      FCC
                                 DATCON    4238
  CNVRT   *    52CE       99
  DBFCR   *    52C0      2A7
  F36F90=  *   5566      2BC
                                 F36F90    5568
  IHCECOMI*    58E6      F41
                                 IBCOM=    5828   FDIOCS=   58E4   INTSWTCH  674E
  IHCECOMI2*   6778      65D
                                 SEQCASD   6AE8
  DTI      *   6DDC       F5
  FLT      *   6EC8      235
                                 FSTFS     6EC8   FSTFD     6F5C   FDTFS     6F10   FDTFD     6F34
  FIXFLT   *   710C      151
                                 ITFS      7100   ITFD      7124
  FIX      *   7258       11D
                                 ITI       7258
  M        *   7378        D8
  TRANS    *   745C        EA
  IHCFCVTH*    7540      119D
                                 ADCON=    7540   FCVADUTP   75EA   FCVLOUTP   767A   FCVZOUTP   77CA
                                 FCVIOUTP  7878   FCVEOUTP   807A   FCVCOUTP   8294   INT6SWCH   8578
  IHCEFNTH*    86EC      C12
                                 APITH=    86E0   ADJSWTCH   8A4C
  IHCEFIOS*    88FC      13C8
                                 FIOCS=    88F8   FIOCSSEP   88FE
  IHCUCPT  *   9F6C      350
  CMPRS    *   A2BC      170
  IHCERRM  *   A42C       5BC
                                 ERRMCN    A420   IHCERRE    A438
  IHCUATBL*    A9E0      638
  IHCETRCH*    B01E       28E
                                 IHCTRCH   B018   SARTRA     B030
  $BLANKCOM    B2A8      1024
```

```
   NAME     ORIGIN   LENGTH                NAME   LOCATION     NAME   LOCATION     NAME   LOCATION     NAME   LOCATION

ENTRY ADDRESS      00
TOTAL LENGTH       C2E0

****GREG     DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
```

```
IEF285I   SYS2.LGAPLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.GSFGLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.PL1LIB                                   KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.TELCMLIB                                 KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS2.LGADLIB                                  KEPT
IEF285I   VOL SER NOS= G1SYS1.
IEF285I   SYS1.SSPAK                                    KEPT
IEF285I   VOL SER NOS= G1SYS2.
IEF285I   SYS71156.T154554.RV000.ZBRKS002.LOBMOD        PASSED
IEF285I   VOL SER NOS= G1SCR9,
IEF285I   SYS71156.T154554.RV000.ZBRKS002.R0000943      SYSOUT
IEF285I   VOL SER NOS= G1SCR9,
IEF285I   SYS71156.T154564.RV000.ZBRKS002.R0000944      DELETED
IEF285I   VOL SER NOS= G1SCR9.
IEF285I   TELCP3                                        KEPT
IEF285I   VOL SER NOS= 1057H ,
IEF285I   SYS71156.T154554.RV000.ZBRKS002.S0000945      SYSIN
IEF285I   VOL SER NOS= G1SCR1.
IEF285I   SYS71156.T154554.RV000.ZBRKS002.S0000945      DELETED
IEF285I   VOL SER NOS= G1SCR1,
        JOB NBF   A35 STEP NBR 01  ZBRKS002  LINK    PGM=IEWL    CARDS=00002   INITIATION TIME=21.34.55.73 DATE=06-07-71
 ----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.05        STEP-01  LINK      TERMINATION TIME=21.37.31.48 DATE=06-07-71
       I/O TIME BY DEVICE,    DISK=******2.36,BRUN=******.00,TAP=********.00,CELL=******.00,OTHR=******.00
 ----- STEP REGION SIZE=0300K  MAXIMUM REGION SIZE USED=0300K   PERCENT OF REGION USED=99
XXGO      EXEC PGM=*.LINK,SYSLMOD,COND=(5,LT),REGION=100K                    00002200
XXFTCSF001 DD  DDNAME=DATA5                                                  00002300
XXFTCSF001 DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),              00002400
XX             SPACE=(CYL,(1,1))                                             00002500
XXFT07F001 DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7200),                   00002600
XX             SPACE=(TRK,(1,20))                                            00002700
***  INSERT  //GO.FT07F001 DD DSN=&&PUNCH,SYSOUT=B  FOR PUNCHED OUTPUT      00002800
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=125,BLKSIZE=629),               00002900
XX             SPACE=(TRK,(1,20))                                            00003000
//GO.SYSUDUMP DD  SYSOUT=A
//GO.FORTAP DD DSNAME=INDP3A,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=A568H,
// DCB=(LRECL=1562,BLKSIZE=1562,DEN=1)
//GO.DATA5 DD *
//*
IEF236I ALLOC. FOR ZBRKS002 GO
IEF237I 332 ALLOCATED TO PGM=*.DD
IEF237I 231   ALLOCATED TO STCS=001
IEF237I 340   ALLOCATED TO FT06F001
IEF237I 341   ALLOCATED TO SYSPRINT
IEF237I 342   ALLOCATED TO SYSUDUMP
IEF237I 001   ALLOCATED TO FORTAP
```

S/360 TELSAT PROGRAM(TEST,EDIT,AND LIST ORB3A TAPE)

INPUT ORB3A TAPE NO. IS 4568H SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 69531

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	700718	6	22	0
INPUT ORB3A SATELLITE DATA END TIME	700820	21	49	59

SUNLIGHT REPORT OPTION CHOSEN FOR THIS RUN

SUNLIGHT ENTRANCE						SUNLIGHT EXIT					
PASS NO.	DATE	DAY OF YR	HR	MIN	SEC	PASS NO.	DATE	DAY OF YR	HR	MIN	SEC
117	700719	200	22	56	30	118	700723	204	7	18	30
119	700726	207	16	20	31	120	700730	211	0	45	21
121	700802	214	10	3	44	122	700805	217	18	27	24
123	700809	221	3	24	6	124	700812	224	11	53	45
125	700815	227	20	52	59						

NORMAL TERMINATION OF SUNLIGHT REPORT OPTION.

```
IEF236I  SYS71156.T164554.RV000.ZBRKS002.L00M00        PASSED
IEF285I  VOL SER NOS= G1SCR9.
IEF236I  SYS71156.T164554.RV000.ZBRKS00F.S0000949      SYSIN
IEF285I  VOL SER NOS= G1SCR2.
IEF236I  SYS71156.T164554.RV000.ZBRKS002.S0000949      DELETED
IEF285I  VOL SER NOS= G1SCR2.
IEF236I  SYS71156.T164554.SV000.ZBRKS002.R0000946      SYSOUT
IEF285I  VOL SER NOS= G1SCR4.
IEF236I  SYS71156.T164554.SV000.ZBRKS002.R0000947      DELETED
IEF285I  VOL SER NOS= G1SCR5.
IEF236I  SYS71156.T164554.SV000.ZBRKS002.R0000948      DELETED
IEF285I  VOL SER NOS= G1SCR6.
IEF285I  INGR3A                                        KEPT
IEF285I  VOL SER NOS= A568H .
-----JOB NBR=635 STEP NBR=02 ZBRKS002 GO        PGM=PGM=*.DD CARDS=00001  INITIATION TIME=21.37.32.45 DATE=06-07-71
----- CPU=000.3 I/O=000.4 CORE=000.1 CHARGE=000.69        STEP=02 GO        TERMINATION TIME=21.40.38.13 DATE=06-07-71
----- I/O TIME BY DEVICE.  DISK=******.18,DRUM=******.00,TAPE=****22.08,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=0100K  MAXIMUM REGION SIZE USED=0084K  PERCENT OF REGION USED=84
IEF236I  SYS71156.T164554.RV000.ZBRKS002.L00M00        DELETED
IEF285I  VOL SER NOS= G1SCR9.

-----CPU=000.3 I/O=000.4 CORE=000.1 CHARGE=000.74  JOB NBR=635 ZBRKS002 360/95  SYSTEM=MVT=19.6  01-16-71 G1
----- I/O TIME BY DEVICE.  DISK=*****2.54,DRUM=******.00,TAPE=****22.16,CELL=******.00,OTHR=******.00
```

Figure A-6. Check Record Option Sample Run Printout

```
//ZBRKS005 JOB (GI0011,311F,T,G004,09,001001),000,MSGLEVEL=1,TYPRUN=HOLD
// EXEC LINKGO
XXDEFAULT PROC NBLK=5)                                                  00000100
XXLINK    EXEC PGM=IEWL,PARM=(MAP,LIST),COND=(5,LT),REGION=300K         00000200
XXLOADLIB DD   DSNAME=SYS2.LOADLIB,DISP=SHR                             00000300
XXNEWLIN  DD   DUMMY                                                    00000400
XXSYSLIB  DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000500
XX        DD DSNAME=SYS2.DUMMY,DISP=SHR                                 00000600
XX        DD DSNAME=SYS1.FORTLIB,DISP=SHR                               00000700
XX        DD DSNAME=SYS2.GSFCLIB,DISP=SHR                               00000800
XX        DD DSNAME=SYS1.PLILIB,DISP=SHR                                00000900
XX        DD DSNAME=SYS1.TELCMLIB,DISP=SHR                              00001000
XX        DD DSNAME=SYS2.LOADLIB,DISP=SHR                               00001100
XX        DD DSNAME=SYS1.SSPAK,DISP=SHR                                 00001200
XXSYSLMOD DD   DSN=&&LUOMJD(GSFC),DISP=(NEW,PASS),UNIT=DISK,            00001300
XX             SPACE=(3072,(&NBLK,40,1))                                00001400
IEF653I SUBSTITUTION JCL - SPACE=(3072,(50,40,1))
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBM,LRECL=121,BLKSIZE=1210),         00001500
XX             SPACE=(TRK,(10,5))                                       00001600
XXSYSUT1  DD   UNIT=DISK,SPACE=(1024,(100,20)),DCB=BLKSIZE=1024         00001700
//TAPELIB DD DSN=IEL03J,VOL=SER=1057H
X/TAPELIB DD   DUMMY,VOL=SER=TAPEIN,UNIT=(9TRACK,,DEFER),LABEL=(,BLP),  00001800
XX             DISP=(OLD,KEEP),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)     00001900
//LINK.SYSLIN DD *
X/SYSLIN  DD   DSN=&&OBJMOD,DISP=(OLD,DELETE),DCB=RECFM=FB              00002000
XX        DD   DDNAME=OBJECT                                            00002100
IEF236I ALLOC. FOR ZBRKS005 LINK
IEF237I 547    ALLOCATED TO LOADLIB
IEF237I 547    ALLOCATED TO SYSLIB
IEF237I 547    ALLOCATED TO
IEF237I 547    ALLOCATED TO
IEF237I 547    ALLOCATED TO
IEF237I 547    ALLOCATED TO
IEF237I 547    ALLOCATED TO
IEF237I 547    ALLOCATED TO
IEF237I 337    ALLOCATED TO
IEF237I 540    ALLOCATED TO SYSLMOD
IEF237I 541    ALLOCATED TO SYSPRINT
IEF237I 542    ALLOCATED TO SYSUT1
IEF237I 0D3    ALLOCATED TO TAPELIB
IEF237I 231    ALLOCATED TO SYSLIN
```

```
F12B-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED-MAP,LIST
            VARIABLE OPTIONS USED -  SIZE=(307200,12288)-          DEFAULT OPTION(S) USED
IEW0960     INCLUDE TAPELIB
IEW0000     ENTRY MAIN


                                        MODULE MAP

   CONTROL SECTION                                ENTRY

    NAME      ORIGIN   LENGTH      NAME  LOCATION      NAME  LOCATION      NAME  LOCATION      NAME  LOCATION

   MAIN          00     E85
   ASCEND       E88     4E2
   SELECT      1370     062
   SUNLGT      2000     1000
   CHKREC      3190     C66
   RWTAP4      3DF0     43E
                                  RTAPE4   40CC  WTAPE4   4148  WSNEO=   41AC
   DATCON=     4238     ECC
                                  DATCON   4238
   CNVRT   *   5208      98
   DBFOR   *   52C0     2A7
   F36F90=*    5568     28C
                                  F36F90   5568
   IHCECOMH*   5828     F41
                                  IBCOM=   5828  FDIOCS=   58E4  INTSWTCH  674E
   IHCECMH2*   6770     333
                                  SLODASD  6AE8
   DTI     *   6DD0      F0
   FLT     *   6EC8     2J6
                                  FSTFS    6EC8  FSTFD    6EEC  FDTFS    6F10  FDTFD    6F34
   FIXFLT  *   7100     151
                                  ITFS     7100  ITFD     7124
   FIX     *   725B     113
                                  ITI      7258
   M       *   7378      D8
   TRANS   *   7450      EA
   IHCFCVTH*   7540     1190
                                  ADCON=   7540  FCVADUTP  75EA  FCVLDUTP  767A  FCVZOUTP  77CA
                                  FCVIOUTP 7878  FCVEOUTP  807A  FCVCOUTP  8294  INT6SWCH  857B
   IHCBENTH*   86B0     512
                                  ARITH=   86E0  ADJSWTCH  8A4C
   IHCEFIOS*   88F8     136B
                                  FIOCS=   88F8  FIOCSBEP  88FE
   IHCUOPT *   9E60     35D
   CMPRS   *   A280     17D
   IHCERRM *   A420     6BC
                                  ERRMON   A420  IHCERRE   A438
   IHCUATBL*   A9E0     63B
   IHCETRCH*   B019     282
                                  IHCTRCH  B019  ENRTRA    B020
   $BLANKCOM   B2A8     1024
```

```
 NAME     ORIGIN   LENGTH                NAME   LOCATION    NAME   LOCATION    NAME   LOCATION    NAME   LOCATION

 ENTRY ADDRESS        00
 TOTAL LENGTH         6200

 ****GSFC      DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET
```

```
IEF285I   SYS2.LOADLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.DUMMY                                    KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.FORTLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.GSPCLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.PL1LIB                                   KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.TELCMLIB                                 KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS2.LOADLIB                                  KEPT
IEF285I   VOL SER NOS= G15YS1.
IEF285I   SYS1.SSPAK                                    KEPT
IEF285I   VOL SER NOS= G15YS2.
IEF285I   SYS71158.T164644.RV000.ZJRKS005.LODMOD        PASSED
IEF295I   VOL SER NOS= G15CR4.
IEF285I   SYS71159.T164504.SV000.ZJRKS005.R0000957      SYSOUT
IEF285I   VOL SER NOS= G15CR5.
IEF285I   SYS71158.T154554.RV000.ZJRKS005.R0000958      DELETED
IEF285I   VOL SER NOS= G13CR6.
IEF285I   TELCRJ                                        KEPT
IEF285I   VOL SER NOS= 1057H .
IEF285I   SYS71159.T154554.RV000.ZJRKS005.S0000959      SYSIN
IEF285I   VOL SER NOS= G15CR2.
IEF285I   SYS71158.T164644.RV000.ZJRKS005.S0000959      DELETED
IEF285I   VOL SER NOS= G15CR2.
      JOB NBR  058 STEP NBR  01  ZJRKS005  LINK    PGM=IEWL     CARDS=00002   INITIATION TIME=01.38.14.56 DATE=06.08.71
----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.06          STEP-01  LINK      TERMINATION TIME=01.38.00.20 DATE=06-08-71
      I/O TIME BY DEVICE- DISK=******2.36,DRUM=******.00,TAPE=******.08,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=0300K  MAXIMUM REGION SIZE USED=0300K   PERCENT OF REGION USED=99
XXGO     EXEC PGM=*.LINK,SYSLMOD,COND=(5,LT),REGION=100K                    00002200
XXFT05F001 DD  DDNAME=DATA5                                                 00002300
XXFT06F001 DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),             00002400
XX             SPACE=(CYL,(1,1))                                            00002500
XXFT07F001 DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),                  00002600
XX             SPACE=(TRK,(1,20))                                           00002700
*** INSERT  //GO.FT07F001 DD DSN=CCDECK,SYSOUT=B  FOR PUNCHED OUTPUT        00002800
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=125,BLKSIZE=629),              00002900
XX             SPACE=(TRK,(1,20))                                           00003000
//GO.SYSUDUMP DD SYSOUT=A
//GO.FORTAP DD DSNAME=INJJA,UNIT=2400-7,
// LABEL=(,BLP),DISP=(OLD,KEEP),VOLUME=SER=4405C,
// DCB=(LRECL=1542,BLKSIZE=1542,DEN=1)
//GO.FT14F001 DD UNIT=DISK,SPACE=(CYL,(9,1)),
// DCB=(RECFM=VS,BLKSIZE=2056)
//GO.FT15F001 DD DSNAME=OR3OUT,UNIT=2400-7,DISP=(NEW,KEEP),
// LABEL=(,BLP),VOLUME=SER=A920H,
// DCB=(RECFM=F,DEN=1,BLKSIZE=1536)
//GO.DATA5 DD *
//
IEF236I ALLOC. FOR ZJRKS005 GO
IEF237I 540   ALLOCATED TO PGM=*.DD
IEF237I 232   ALLOCATED TO FT05F001
IEF237I 540   ALLOCATED TO FT06F001
IEF237I 540   ALLOCATED TO SYSPRINT
IEF237I 540   ALLOCATED TO SYSUDUMP
IEF237I 000   ALLOCATED TO FORTAP
IEF237I 540   ALLOCATED TO FT14F001
IEF237I 0C0   ALLOCATED TO FT15F001
```

S/360 TELOR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TAPE)

INPUT ORB3A TAPE NO. IS 4405C SATELLITE ID ON INPUT ORB3A TITLE RECORD IS 67731

	DATE	HR	MIN	SEC
INPUT ORB3A SATELLITE DATA START TIME	681130	0	48	0
INPUT ORB3A SATELLITE DATA END TIME	681130	2	0	59

CHECK RECORD OPTION CHOSEN FOR THIS RUN

SECONDS OF DAY OF 1ST DATA ITEM IN A RECORD ARE NOT WITHIN LEGAL LIMITS.
SECONDS SHOULD BE LESS THAN 86400 AND GREATER THAN OR EQUAL TO ZERO.

INPUT ORB3A CHECK FAIL DATA RECORD

0.10000000D 01 0.68113000D 06 0.33500000D 03 0.87000000D 05 0.36706537D 04-0.17664763D 04
-0.65657708D 04 0.60189950D 01-0.13219485D 01 0.43289945D 01-0.12245143D 03-0.53969418D 02
0.53286698D 03-0.37061149D 00-0.83337023D 00-0.36355567D 00 0.22758511D 01 0.40431033D 00
-0.34997079D 03-0.39468415D 02 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
0.67200000D 04 0.40234917D 04-0.18760676D 04-0.52940851D 04 0.57391273D 01-0.17598740D 01
-0.47238653D 01-0.12260138D 03-0.59193528D 02 0.54332982D 03-0.37060022D 00-0.83817431D 00
-0.36355244D 00 0.20136029D 01 0.38643759D 00 0.34874449D 03-0.23857249D 02 0.72450000D 04
-0.10000000D 01 0.68113000D 06-0.33500000D 03 0.67800000D 04 0.43588787D 04-0.19775214D 04
-0.49993623D 04 0.54366432D 01-0.15208116D 01 0.50963577D 01-0.12165663D 03-0.46423786D 02
-0.55411594D 03-0.37)63896D 00-0.83837838D 00-0.36355421D 00 0.18164368D 01 0.36822875D 00
0.34856472D 03-0.17044559D 02 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
-0.68400000D 04-0.16754577D 04-0.20704390D 04-0.46329987D 04 0.51122319D 01-0.14754482D 01
0.54450279D 01-0.12138992D 03-0.42661371D 02 0.5e519295D 03-0.37057769D 00-0.83838246D 00
-0.36355598D 00-0.16554814D 01 0.34999104D 00 0.34851942D 03-0.99897095D 01 0.72450000D 04
0.10000000D 01 0.68113000D 06 0.33500000D 03 0.69000000D 04 0.49719407D 04-0.21544633D 04
-0.43464622D 04 0.47675231D 01-0.13244883D 01 0.57685628D 01-0.12118357D 03-0.38907190D 02
0.57652723D 03-0.37056042D 00-0.83838654D 00-0.36355774D 00 0.15261980D 01 0.33202656D 00
-0.34861145D 03-0.26539928D 01 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
0.69600000D 04 0.52471825D 04-0.22292799D 04-0.39912974D 04 0.44042491D 01-0.11686488D 01
-0.60657943D 01-0.12162434D 03 0.35161972D 02 0.58809436D 03-0.37055516D 00-0.83839062D 00
-0.36355951D 00 0.14218039D 01 0.31464214D 00 0.34885763D 03 0.50130861D 01 0.72450000D 04
-0.10000000D 01 0.68113000D 06 0.33500000D 03 0.70200000D 04 0.55061144D 04-0.22946180D 04
-0.36191136D 04 0.40241629D 01-0.10085565D 01 0.63359974D 01-0.12090231D 03-0.31426313D 02
-0.59982832D 03-0.37054333D 00-0.83839469D 00-0.36355128D 00 0.13372975D 01 0.29815453D 00
0.54929173D 03 0.13042604D 02 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
-0.70800000D 04-0.57297920D 04-0.23502503D 04-0.32315780D 04 0.36290770D 01-0.84524193D 00
0.65773893D 01-0.12080939D 03-0.27700720D 02 0.61172204D 03-0.37053263D 00-0.83839877D 00
-0.36356304D 00 0.11269222D 01 0.29288604D 00 0.34997343D 03 0.21473675D 02 0.72450000D 04
0.10000000D 01 0.68113000D 06 0.33500000D 03 0.71400000D 04 0.59353405D 04-0.23959933D 04
-0.28404359D 04 0.32283819D 01-0.67913732D 00 0.67901328D 01-0.12074112D 03-0.23985620D 02
0.62372710D 03-0.37052136D 00-0.83840284D 00-0.36356481D 00 0.12150366D 01 0.26917960D 00
-0.35100843D 04 0.30332726D 02 0.72450000D 04-0.10000000D 01 0.68113000D 06-0.33500000D 03
0.72000000D 04 0.61160559D 04-0.24317076D 04-0.24173531D 04 0.28012893D 01-0.51107203D 00
-0.69733295D 01-0.12069121D 03-0.20281381D 02 0.63580386D 03-0.37051009D 00-0.83840692D 00
-0.36356658D 00 0.11724407D 01 0.25735228D 00 0.35259457D 03 0.39625155D 02 0.72450000D 04
-0.10000000D 01-0.68113000D 06-0.33500000D 03 0.72000000D 04 0.62713066D 04-0.24572972D 04
-0.19942066D 04 0.23725207D 01-0.34176879D 00 0.71255239D 01-0.12065624D 03-0.16588315D 02
0.64791132D 03-0.37049833D 00-0.83841100D 00-0.36356834D 00 0.11403582D 01 0.24772329D 00
0.35513749D 03 0.49314464D 02 0.72450000D 04 0.99000000D 02 0.68000000D 02 0.99000000D 03
0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0

LAST DATA RECORD WRITTEN ON OUTPUT 9883A TAPE

```
 0.10000000D 01 0.68113000D 06 0.33500000D 03 0.54000000D 04-0.46940585D 04 0.13733415D 04
-0.47339606D 04-0.49969042D 01-0.22454982D 01-0.54903011D 01-0.72203902D 02-0.44246938D 02
 0.43868613D 03-0.37084806D 00-0.83828460D 00-0.36351354D 00 0.30884130D 01 0.39986132D 00
-0.14761818D 03-3.26404855D 02 0.72450000D 04-0.10000000D 01 0.68113000D 06-0.33500000D 03
 0.54600000D 04-0.43841680D 04 0.12355951D 04-0.59523839D 04 0.53348854D 01-0.23443301D 01
-0.51199926D 01-3.72521629D 02-0.48143714D 02-0.43599843D 03-0.37083679D 00-0.83828867D 00
-0.36351531D 00 0.37064467D 01 0.41052220D 00 0.14578319D 03-0.31885667D 02 0.72450000D 04
 0.10000000D 01 0.68113000D 06 0.33500000D 03 0.55200000D 04-0.40543497D 04 0.10922328D 04
-0.53477760D 04 0.56549420D 01-0.24326147D 01-0.47235046D 01 0.72933024D 02-0.52037774D 02
-0.43414409D 03-3.37932553D 00-0.83829276D 00-0.36351708D 00 0.45443025D 01 0.42141183D 00
 0.14588640D 03-0.37260188D 02 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
-0.55809000D 04-0.37060849D 04 0.94320146D 03-0.56187670D 04 0.59495111D 01-0.25098964D 01
-0.43060451D 01 0.73470896D 02-0.55927061D 02 0.43311511D 03-0.37081426D 00-0.83829683D 00
-0.36351585D 00 0.57133645D 01 0.47210527D 00 0.14487890D 03-0.42574895D 02 0.72450000D 04
 0.10000000D 01 0.68113000D 06 0.33500000D 03 0.56400000D 04-0.33409479D 04 0.79127325D 03
-0.58641046D 04 0.62171119D 01-0.25757813D 01-0.38687465D 01 0.74184597D 02-0.59808988D 02
 0.43289991D 03-0.37080299D 00-0.83830091D 00-0.36352062D 00 0.73995597D 01 0.44296718D 00
-0.14368424D 03-0.47857734D 02 0.72450000D 04-0.10000000D 01 0.68113000D 06-0.33500000D 03
 0.57000000D 04-0.29605974D 04 0.63504224D 03-0.60826627D 04 0.64564172D 01-0.26299407D 01
-0.34137582D 01 0.76151935D 02-0.63680009D 02 0.43348396D 03-0.37079173D 00-0.83830499D 00
-0.36352239D 00 0.99187491D 01 0.45318098D 00 0.14218505D 03-0.53122111D 02 0.72450000D 04
 0.10000000D 01 0.68113000D 06-0.33500000D 03 0.57600000D 04-0.25667672D 04 0.47592021D 03
-0.62734407D 04 0.56662565D 01-0.25721106D 01-0.29433262D 01 0.76503423D 02-0.67534763D 02
-0.43484395D 03-0.37078947D 00-0.83830907D 00-0.36352416D 00 0.13795952D 02-0.46275805D 00
 0.14019160D 03-0.58370165D 02 0.72450000D 04 0.10000000D 01 0.68113000D 06 0.33500000D 03
-0.58200000D 04-0.21612560D 04-0.31463269D 03-0.64355994D 04 0.68456311D 01-0.27020964D 01
-0.24597774D 01 0.78474157D 02-0.71364179D 02 0.43697825D 03-0.37076920D 00-0.83831315D 00
-0.36352592D 00 0.19776707D 02-0.47152685D 00 0.14736958D 03-0.63591640D 02 0.72450000D 04
 0.10000000D 01 0.68113000D 06 0.33500000D 03 0.58800000D 04-0.17459174D 04 0.15191488D 03
-0.65634055D 04 0.69937143D 01-0.27197719D 01-0.19655084D 01 0.81533461D 02-0.75150706D 02
 0.43984744D 03-0.37075794D 00-0.83831722D 00-0.36352769D 00 0.28213967D 02 0.47930919D 00
-0.13396604D 03-0.68752073D 02 0.72450000D 04-0.10000000D 01 0.68113000D 06-0.33500000D 03
 0.59400000D 04-0.13226493D 04-0.11492509D 02-0.66712948D 04 0.71098565D 01-0.27250793D 01
-0.14629607D 01 0.86753474D 02-0.78854257D 02 0.44343429D 03-0.37074667D 00-0.83832131D 00
-0.36352946D 00 0.36400327D 02 0.48589580D 00 0.22698312D 03-0.71659163D 02 0.72450000D 04
 0.10000000D 01 0.68113000D 06-0.33500000D 03 0.60000000D 04-0.89338290D 03-0.17484747D 03
-0.67438448D 04 0.71935922D 01-0.27180314D 01-0.95461002D 00 0.97078568D 02-0.82359987D 02
-0.44771444D 03-0.37073541D 00-0.83832538D 00-0.36353125D 00 0.37060918D 02 0.49103277D 00
 0.23297837D 03-0.72666491D 02 0.72450000D 04 0.99000000D 02 0.68000000D 02 0.99900000D 03
 0.0          0.0          0.0          0.0          0.0          0.0
 0.0          0.0          0.0          0.0          0.0          0.0
 0.0          0.0          0.0          0.0          0.0          0.0
```

OUTPUT ORD3A TAPE TITLE RECORD

```
 0.76799361D 08 0.67731000D 05 0.0             0.63113000D 06 0.33500000D 03 0.28800000D 04
 0.68113000D 06 0.33600000D 03 0.50000000D-04 0.60000000D 02 0.12000000D 02 0.21000000D 02
 0.16000000D 02 0.25600000D 03 0.91000000D 02-0.48838916D 09 0.10878223D 10-0.90785376D 09
 0.13464266D 10-0.10338335D 10 0.10788439D 10-0.71716254D 09-0.23586741D 09 0.15644918D 10
 0.10779526D 10 0.0            0.68110100D 06 0.30600000D 03 0.70411396D 00 0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.16237200D-02-0.64000000D-05 0.69000000D-05 0.0            0.68112900D 06 0.33400000D 03
 0.0            0.69904725D 04 0.10959623D 01 0.85994324D 02 0.34033531D 03 0.0
 0.24599659D 03 0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.32800000D 01 0.45451520D 05 0.55279040D 06 0.10000000D 01 0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.10000000D 01 0.10000000D 01 0.10000000D 01 0.0            0.20000000D 01 0.0
 0.0            0.0            0.0            0.0            0.29984665D 04 0.10959623D 01
 0.28679397D 01 0.11903396D 01 0.69305134D 00-0.30529187D 00 0.77491631D 00 0.68412777D 00
-0.19588515D 00 0.65344582D 00 0.10835214D 01 0.96612279D 00 0.54837900D 01 0.11375108D 01
 0.54837900D 01 0.42934595D 01 0.15008841D 01 0.59399717D 01-0.26341980D 01 0.87157869D 00
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.94373606D 01 0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.68000000D 02 0.11000000D 02
 0.29000000D 02 0.0            0.0            0.0            0.0            0.0
 0.0            0.20000000D 01 0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
 0.0            0.0            0.0            0.0            0.0            0.0
```

NORMAL TERMINATION OF CHECK RECORD OPTION.

```
IEF285I   SYS71158.T154554.RV000.ZBRKS005.LODMOD        PASSED
IEF285I   VOL SER NOS= G15CR4.
IEF285I   SYS71158.T154554.RV000.ZBRKS005.S0000964      SYSIN
IEF285I   VOL SER NOS= G15CR3.
IEF285I   SYS71158.T154554.RV000.ZBRKS005.S0000964      DELETED
IEF285I   VOL SER NOS= G15CR3.
IEF285I   SYS71158.T154554.RV000.ZBRKS005.R0000960      SYSOUT
IEF285I   VOL SER NOS= G15CR4.
IEF285I   SYS71158.T154554.RV000.ZBRKS005.R0000961      DELETED
IEF285I   VOL SER NOS= G15CR4.
IEF285I   SYS71158.T154554.RV000.ZBRKS005.R0000962      DELETED
IEF285I   VOL SER NOS= G15CR4.
IEF285I   INURSA                                        KEPT
IEF285I   VOL SER NOS= 4425C .
IEF285I   SYS71158.T154554.RV000.ZBRKS005.R0000963      DELETED
IEF285I   VOL SER NOS= G15CR4.
IEF285I   OUTOUT                                        KEPT
IEF285I   VOL SER NOS= 4920H .
IEF280E K 000,4405C,,ZBRKS005,GO
-----JOB NBR-  058 STEP NBR- 02  ZBRKS005  GO       PGM=PGM=*.DD CARDS=00001   INITIATION TIME=01.38.00.61 DATE=06-08-71
----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.03       STEP=02  GO          TERMINATION TIME=01.39.38.23 DATE=06-08-71
----- I/O TIME BY DEVICE.  DISK=******.73,DRUM=******.00,TAPE=******.16,CELL=******.00,OTHR=******.00
----- STEP REGION SIZE=9100K  MAXIMUM REGION SIZE USED=9096K  PERCENT OF REGION USED=96
IEF285I   SYS71158.T154554.RV000.ZBRKS005.LODMOD        DELETED
IEF285I   VOL SER NOS= G15CR4.

----- CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.09    JOB NBR-058  ZBRKS005  360/95      SYSTEM=MVT-19.6   01-16-71  G1
----- I/O TIME BY DEVICE.  DISK=******.10,DRUM=******.00,TAPE=******.24,CELL=******.00,OTHR=******.00
```

APPENDIX B

S/360 TELOR3 SOURCE PROGRAM CROSS REFERENCE CHARTS

This appendix presents three types of cross reference charts pertaining to the S/360 TELOR3 Source Program. The chart types and corresponding figure numbers are listed below:

1. A chart displaying subroutine COMMON block usage:
   Figure B-1

2. Charts displaying input/output units vs internal statement numbers (ISN) for each subroutine:
   Figures B-2 through B-7

3. Charts displaying calls to subroutines vs ISN numbers for each subroutine:
   Figures B-8 through B-13

SUBROUTINE / COMMON BLOCK	MAIN	ASCEND	SELECT	SUNLGT	CHKREC	RWTAP4
COMMON (UNLABELED)	X	X	X		X	

Figure B-1. Subroutine COMMON Block Usage Cross's Reference Chart

ISN / INPUT/OUTPUT	12	17	19	42	46	48	50	53	56	80	81	82	90	99	102	104	106	108
READ DATA CARD	X																	
WRITE ON SYSTEM PRINTER		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure B-2. Cross Reference Chart of Input/Output Units VS ISN Numbers for the MAIN Routine

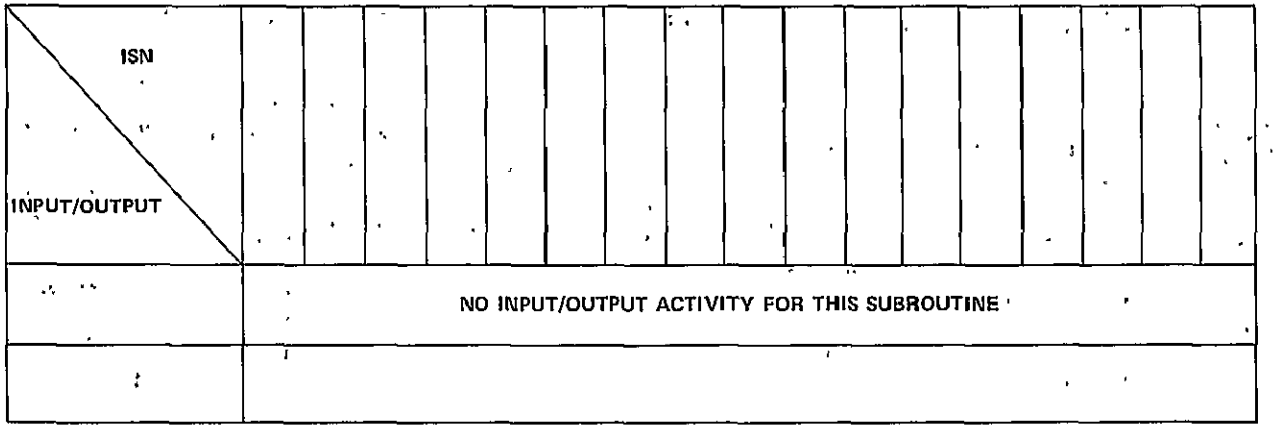


Figure B-3. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine ASCEND

INPUT/OUTPUT \ ISN	8	22	13	33	35	44	60	61	63	67	69	76	77	79	89	109	110	111	123	124	126	139	142	148	155	172	174	175
READ DATA CARD		X																										
READ FROM SCRATCH DISK					X				X	X	X			X				X			X	X		X	X			
WRITE ON SYSTEM PRINTER				X		X									X											X	X	X
WRITE ON SCRATCH DISK	X																											
BACKSPACE SCRATCH DISK							X	X				X	X			X	X		X	X								
REWIND SCRATCH DISK			X																				X					

Figure B-4. - Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine SELECT

ISN / INPUT/OUTPUT	10	12	52	55	59	61	62
WRITE ON SYSTEM PRINTER	X	X	X	X	X	X	X

Figure B-5. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine SUNLGT

ISN / INPUT/OUTPUT	10	13	14	15	22	26	30	34	38	42	44	46	48	51	53	54	55	56	61	62	67	70	72	75	83
READ FROM SCRATCH DISK				X														X		X					
WRITE ON SYSTEM PRINTER					X	X	X	X	X	X	X	X	X	X							X	X	X	X	X
WRITE ON SCRATCH DISK	X																								
WRITE END-OF-FILE ON SCRATCH DISK		X																							
BACKSPACE SCRATCH DISK															X	X	X								
REWIND SCRATCH DISK			X																X						

Figure B-6. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine CHKREC

ISN / INPUT/OUTPUT	10	15	21	24	26	27	28
READ[1] FROM INPUT ORB3A TAPE	X						
WRITE[2] ON OUTPUT ORB3A TAPE		X	X	X	X		
WRITE[2] END-OF-FILE ON OUTPUT ORB3A TAPE						X	
REWIND OUTPUT ORB3A TAPE							X

[1]THE SYSTEM UTILITY ROUTINE DBFOR ACTUALLY DOES THE READING.

[2]THE SYSTEM UTILITY ROUTINE DATCON (MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE COMPLEMENTING OF NEGATIVE NUMBERS) ACTUALLY DOES THE WRITING.

Figure B-7. Cross Reference Chart of Input/Output Units VS ISN Numbers for Subroutine RWTAP4

ISN / SUBROUTINES CALLED	9	43	51	54	57	60	62	75	86	98
ASCEND									X	
SELECT			X							
SUNLGT				X						
CHKREC					X					
RWTAP4 (STANDARD ENTRY)		X								
RWTAP4 (ENTRY RTAPE4)	X						X			
RWTAP4 (ENTRY WTAPE4)						X		X		
RWTAP4 (ENTRY WSNEOF)										X

Figure B-8. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for the MAIN Routine

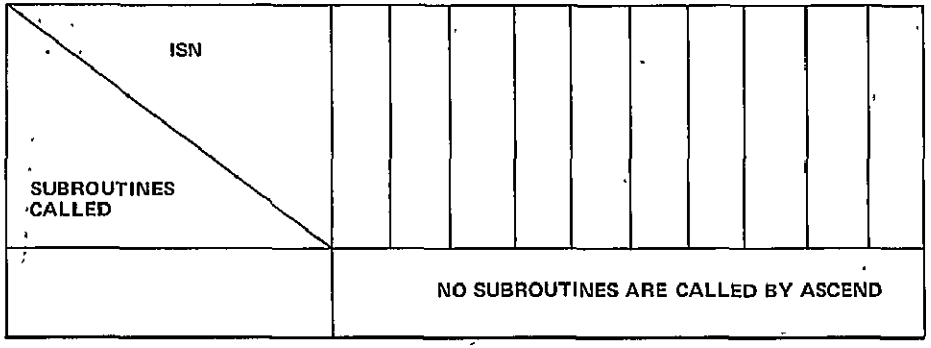
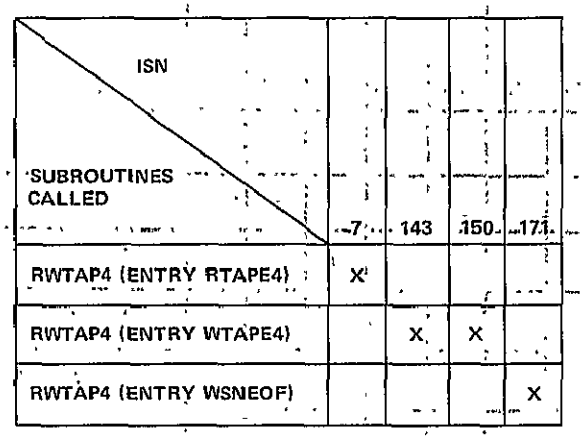


Figure B-9. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine ASCEND



SUBROUTINES CALLED \ ISN	7	143	150	171
RWTAP4 (ENTRY RTAPE4)	X			
RWTAP4 (ENTRY WTAPE4)		X	X	
RWTAP4 (ENTRY WSNEOF)				X

Figure B-10. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine SELECT

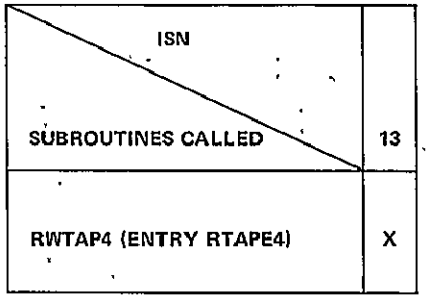
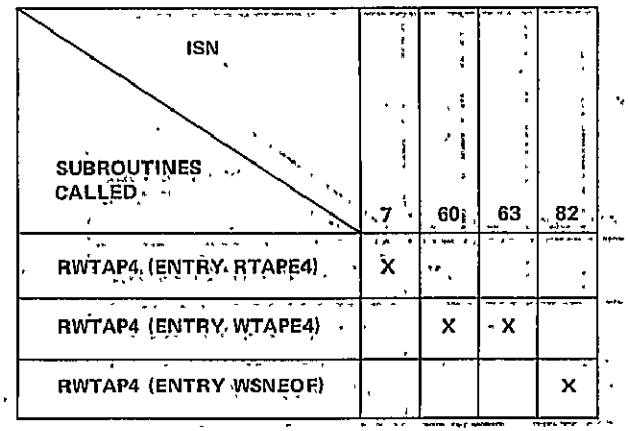


Figure B-11. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine SUNLGT



SUBROUTINES CALLED \ ISN	7	60	63	82
RWTAP4 (ENTRY RTAPE4)	X			
RWTAP4 (ENTRY WTAPE4)		X	X	
RWTAP4 (ENTRY WSNEOF)				X

Figure B-12. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine CHKREC

SUBROUTINES CALLED \ ISN	6	7	10	11	14	15	20	21	23	24	25	26	27
DBFOR			X										
CNVRT				X									
DATCON	X	X			X	X	X	X	X	X	X	X	X

Figure B-13. Cross Reference Chart of Calls to Subroutines VS ISN Numbers for Subroutine RWTAP4

APPENDIX C

S/360 TELOR3 SOURCE PROGRAM COMPILED LISTING

This appendix presents a compiled listing of the S/360 TELOR3 Source Program. For ready reference the page number on which each subroutine begins in the listing appears below:

Figure C-1. Compiled Listing of the S/360 TELOR3 Source Program

```
//ZBRKS000 JOB (CI0011311F,T,C0C4C9,0C1001),C6Q,MSGLEVEL=1
//    EXEC  FORTRANH
XXDEFAULT PROC NBLK=20                                                  00000100
XXSOURCE  EXEC PGM=IEKAA00,REGION=300K                                  00000200
XXSYSLIN  DD  DSN=&&OBJMOD,UNIT=DISK,SPACE=(3200,(&NBLK,10),,,ROUND),   00000300
IEF653I SUBSTITUTION JCL - DSN=&&OBJMOD,UNIT=DISK,SPACE=(3200,(20,10),,,ROUND),
XX            DISP=(MOD,PASS),DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)      00000400
XXSYSPRINT DD  SYSOUT=A,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265),         00000500
XX            SPACE=(CYL,(2,1))                                         00000600
XXSYSPUNCH DD  DUMMY,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280),              00000700
XX            SPACE=(TRK,(10,5))                                        00000800
XXSYSUT1   DD  UNIT=DISK,DCB=(RECFM=FE,LRECL=105,BLKSIZE=3465),         00000900
XX            SPACE=(3465,(15,15))                                      00001000
XXSYSUT2   DD  UNIT=DISK,SPACE=(4096,(2,1)),DCB=BLKSIZE=4096            00001100
//SOURCE.SYSIN DD *
//
IEF236I ALLOC. FOR ZBRKS000 SOURCE
IEF237I 330  ALLOCATED TO SYSLIN
IEF237I 330  ALLOCATED TO SYSPRINT
IEF237I 331  ALLOCATED TO SYSUT1
IEF237I 330  ALLOCATED TO SYSUT2
IEF237I 230  ALLOCATED TO SYSIN
```

```
LEVEL 19 ( JUNE 70 )                    OS/360  FORTRAN-H                    DATE  71.158/11.43.48

          COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
C     MAIN ROUTINE FOR TELOR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TAPE)
C     PURPOSE
C       MAIN SERVES AS THE EXECUTIVE OR SUPERVISORY ROUTINE FOR FOUR OF
C       THE FIVE OPTIONS IN THE S/360 TELOR3 PROGRAM.THE REMAINING
C       OPTION(CHANGE PASS NUMBERS AND REPORT OPTION) IS PERFORMED
C       BY LOGIC CONTAINED WITHIN MAIN.
C     CALLING SEQUENCE
C       MAIN IS THE EXECUTIVE ROUTINE FOR THE TELOR3 PROGRAM AND,
C       THEREFORE,HAS NO ASSOCIATED CALLING SEQUENCE.
C     COMMON AREA(DESCRIPTION SERVES FOR ALL SUBROUTINES USING COMMON)
C       INPUT TO MAIN
C         ISAVE  = A SIX-WORD ARRAY FILLED BY SUBROUTINE ASCEND.CONTAINS
C                  SIX OF THE SEVEN VARIABLES NEEDED FOR ONE LINE OF
C                  INFORMATION IN AN ASCENDING NODE REPORT.
C                  ISAVE(1) = PASS NUMBER
C                  ISAVE(2) = PASS NUMBER YEAR-MONTH-DAY
C                  ISAVE(3) = PASS NUMBER DAY OF YEAR
C                  ISAVE(4) = PASS NUMBER HOUR OF DAY
C                  ISAVE(5) = PASS NUMBER MINUTE OF HOUR
C                  ISAVE(6) = PASS NUMBER SECOND OF MINUTE
C         PERIOD = CALCULATED BY SUBROUTINE ASCEND AND IS THE PERIOD OF
C                  TIME(MINUTES) BETWEEN SUCCESSIVE PASS NUMBERS.THIS IS
C                  THE SEVENTH AND LAST VARIABLE NEEDED FOR ONE LINE OF
C                  INFORMATION IN AN ASCENDING NODE REPORT.
C       OUTPUT FROM MAIN
C         READIN = A 256-WORD ARRAY CONTAINING AN ORB3A DATA RECORD.
C                  SENTINEL ITEM RECORD,OR A SENTINEL RECORD.
C         ISET   = FLAG USED BY SUBROUTINE ASCEND TO DETERMINE PROPER
C                  EQUATION FOR CALCULATING PERIOD BETWEEN SUCCESSIVE
C                  PASS NUMBERS.
C                  =0,PERIOD=0.(FOR FIRST PASS NUMBER ONLY)
C                  =1,PERIOD=GENERAL CALCULATION(FOR ALL PASS NUMBERS
C                            AFTER THE FIRST)
C         TITLE  = A 256-WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.
C       MAJOR VARIABLES(IN ADDITION TO ABOVE)
C       IERR          = ERROR INDICATOR RETURNED TO CALLING PROGRAM
C                       REFLECTING UNUSUAL CONDITIONS ENCOUNTERED IN
C                       READING AN INPUT ORB3A RECORD.
C                       =0,NO UNUSUAL CONDITIONS.
C                       =1,END-OF-FILE.
C                       =4,PERMANENT READ ERROR.DATA RETURNED BUT ITS
C                          VALIDITY IS QUESTIONABLE.
C       INCRD         = FORTRAN LOGICAL UNIT NO. FOR CARD READER(5).
C       IREAD1        = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C                       HOUR OF DAY.
C       IREAD2        = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C                       HOUR OF DAY.
C       IREAD3        = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C                       MINUTE OF HOUR.
C       IREAD4        = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C                       MINUTE OF HOUR.
C       IREAD5        = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C                       SECOND OF MINUTE.
C       IREAD6        = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C                       SECOND OF MINUTE.
```

```
C       IREAD7          = INPUT ORB3A TAPE SATELLITE DATA START TIME,
C                         YEAR-MONTH-DAY.
C       IREAD8          = INPUT ORB3A TAPE SATELLITE DATA END TIME,
C                         YEAR-MONTH-DAY.
C       IWORD           = FLAG USED IN WSNEOF(ENTRY POINT TO SUBROUTINE
C                        'RWTAP4'). PROCESSING FOR BRANCHING.
C                         SET BY CALLING ROUTINE.
C                         =1,WSNEOF WRITES ONE SENTINEL ITEM RECORD,TWO
C                            SENTINEL RECORDS,AND AN END-OF-FILE ON OUTPUT
C                            ORB3A TAPE.
C                         =2,WSNEOF WRITES TWO SENTINEL RECORDS AND AN
C                            END-OF-FILE ON OUTPUT ORB3A TAPE.
C       JSYOUT          = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).
C       KASE            = OPTION TO BE PERFORMED FOR THIS RUN(READ FROM
C                         OPTION CARD).
C                         =1,ASCENDING NODE REPORT OPTION.
C                         =2,CHANGE PASS NUMBERS AND REPORT OPTION.
C                         =3,SELECT TIME PERIOD OPTION.
C                         =4,SUNLIGHT REPORT OPTION.
C                         =5,CHECK RECORD OPTION.
C       READIN(1)       = USED IN MAIN TO CHECK FOR PRESENCE OF SENTINEL
C                         ITEM RECORD OR SENTINEL RECORD.
C                         EQ 99999999.,SENTINEL ITEM RECORD OR SENTINEL
C                                      RECORD IS PRESENT.
C                         NE 99999999.,NEITHER SENTINEL TYPE RECORD IS
C                                      PRESENT.
C       READIN(234)     = FLAG WHICH INDICATES PRESENCE OR ABSENCE OF AN
C                         ASCENDING NODE CROSSING DATA ITEM IN ORB3A RECORD
C                         STORED IN READIN.
C                         EQ 999.,NO ASCENDING NODE ITEM IN RECORD.
C                         NE 999.,ASCENDING NODE ITEM EXISTS IN RECORD.
C       READIN(N-20)    = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN
C                         SATELLITE DATA ITEMS IN ORB3A RECORD.
C                         =1,REGULAR SATELLITE DATA ITEM.
C                         =2,ASCENDING NODE CROSSING DATA ITEM.
C                         =3,NORTH POINT DATA ITEM.
C                         =4,DESCENDING NODE DATA ITEM.
C                         =5,SOUTH POINT DATA ITEM.
C                         =6,SUNLIGHT ENTRANCE DATA ITEM.
C                         =7,SUNLIGHT EXIT DATA ITEM.
C       READIN(N)       = PASS NO.(ASCENDING NODE CROSSING NO.) OF KTH OF
C                         ELEVEN SATELLITE DATA ITEMS IN ORB3A RECORD.
C       TAPEIN          = INPUT ORB3A TAPE NO.(READ FROM OPTION CARD).
C       TITLE(1)        = TAPE IDENTIFICATION CODE PRESENT ON INPUT ORB3A
C                         TAPE TITLE RECORD.
C                         =76799361.,THIS IS AN ORB3A TAPE.
C       TITLE(2)        = SATELLITE INDENTIFICATION NO. PRESENT ON INPUT
C                         ORB3A TAPE TITLE RECORD.
C       TITLE(4)        = ORB3A TAPE SATELLITE DATA START TIME,
C                         YEAR-MONTH-DAY.
C       TITLE(6)        = ORB3A TAPE SATELLITE DATA START TIME,
C                         SECONDS OF DAY.
C       TITLE(7)        = ORB3A TAPE SATELLITE DATA END TIME,
C                         YEAR-MONTH-DAY.
C       TITLE(9)        = ORB3A TAPE SATELLITE DATA END TIME,
C                         SECONDS OF DAY.
```

```
C        VALUE          = A NUMBER WHICH IS ONE LESS THAN THE DESIRED VALUE
C                         FOR THE PASS NO. OF THE FIRST ASCENDING NODE
C                         CROSSING DATA ITEM TO BE WRITTEN ON THE OUTPUT
C                         ORB3A TAPE(READ FROM OPTION CARD).
C     REFERENCE
C       IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,**ORBITAL
C       DETERMINATION UTILITY PROGRAMS,**CONTRACT NAS 5-10022,MARCH 1970
C       (TELOR3 PROGRAM SECTION)
C     METHOD
C       MAIN PERFORMS THE FOLLOWING STEPS
C
C         1.READS TITLE RECORD OF TELOR3 INPUT TAPE AND DETERMINES
C           WHETHER THE INPUT IS A BINARY ORB3A TAPE(IF TITLE(1) .NE.
C           76799361.,AN ERROR MESSAGE IS PRINTED AND EXECUTION IS
C           TERMINATED).
C         2.READS OPTION CARD SPECIFYING INPUT ORB3A TAPE NO. AND ONE OF
C           FIVE POSSIBLE TELOR3 OPTIONS TO BE PERFORMED.
C         3.CONVERTS INPUT ORB3A TAPE START AND END TIMES IN SECONDS OF
C           DAY(CONTAINED IN TITLE RECORD) TO START AND END TIMES IN
C           HOURS,MINUTES,AND SECONDS.
C         4.PRINTS OUT TITLE PAGE DISPLAYING
C             A.THE PROGRAM TITLE(TELOR3)
C             B.OPTION SELECTED
C             C.SATELLITE ID
C             D.INPUT ORB3A TAPE NO.
C             E.INPUT ORB3A START AND END TIMES(HOURS.MINUTES.SECONDS)
C
C       THE FOLLOWING DESCRIBES HOW MAIN CONTROLS THE TELOR3 PROGRAM
C       FLOW FOR EACH SPECIFIC ORTION CHOSEN.
C
C       IF THE SUNLIGHT REPORT OPTION,THE SELECT TIME PERIOD OPTION,OR
C       THE CHECK RECORD OPTION IS SELECTED FOR A PARTICULAR JOB
C       SUBMITTAL,MAIN CALLS THE APPROPRIATE SUBROUTINE,THE OPTION IS
C       EXECUTED,CONTROL IS RETURNED TO MAIN,AND THE PROGRAM COMES TO
C       A STOP.
C
C       IF THE ASCENDING NODE REPORT OPTION IS SELECTED,MAIN PRINTS OUT
C       COLUMN HEADINGS FOR THIS REPORT OPTION AND ENTERS A LOOP WHICH
C       PERFORMS THE FOLLOWING STEPS
C
C         1.READS AN INPUT RECORD INTO THE READIN ARRAY.
C         2.CHECKS RECORD TO SEE IF IT IS A DATA OR A SENTINEL TYPE
C           RECORD.
C         3.CHECKS A DATA RECORD FOR PRESENCE OF AN ASCENDING NODE
C           CROSSING DATA ITEM.
C         4.IF AN ASCENDING NODE DATA ITEM IS PRESENT(READIN(234).NE.
C           999.),SUBROUTINE ASCEND IS CALLED,CONROL RETURNS TO MAIN,AN
C           ASCENDING NODE LINE OF INFORMATION JUST PREPARED BY ASCEND
C           IS PRINTED,AND MAIN RETURNS TO THE BEGINNING OF THE LOOP.
C         5.IF AN ASCENDING NODE DATA ITEM IS NOT PRESENT IN THE DATA
C           RECORD(READIN(234).EQ.999.),MAIN RETURNS TO BEGINNING OF
C           THE LOOP.
C         6.WHEN A SENTINEL RECORD OR A SENTINEL ITEM RECORD IS FOUND
C           (READIN(1).EQ.99999999.),A MESSAGE IS PRINTED STATING A
C           NORMAL TERMINATION OF THE ASCENDING NODE REPORT OPTION
C           HAS OCCURRED.
```

```
C
C       IF THE CHANGE PASS NUMBERS AND REPORT OPTION(PERFORMED BY LOGIC
C       CONTAINED MOSTLY WITHIN MAIN) IS SELECTED,MAIN CREATES AN OUTPUT
C       ORB3A TAPE WHICH IS A DUPLICATE OF THE TELOR3 INPUT ORB3A TAPE
C       WITH THE EXCEPTION THAT THE OUTPUT TAPE CONTAINS ALTERED PASS
C       NUMBERS(ALTERED ASCENDING NODE CROSSING NUMBERS).FURTHERMORE,THE
C       PASS NO. OPTION ALSO PRODUCES AN ASCENDING NODE REPORT BASED ON
C       THE OUTPUT ORB3A TAPE.THE FOLLOWING STEPS ARE PERFORMED IN
C       EXECUTING THE CHANGE PASS NUMBERS AND REPORT OPTION
C
C         1.COLUMN HEADINGS FOR THE ASCENDING NODE REPORT BASED ON THE
C           OUTPUT ORB3A TAPE ARE PRINTED OUT BY MAIN.
C         2.THE TITLE ARRAY(CONTAINS INPUT ORB3A TITLE RECORD) IS
C           WRITTEN OUT BY MAIN AS THE TITLE RECORD ON THE OUTPUT ORB3A
C           TAPE.
C         3.MAIN ENTERS A LOOP WHICH PERFORMS THE FOLLOWING
C             A.READS AN INPUT ORB3A RECORD INTO READIN ARRAY.
C             B.CHECKS RECORD(READIN) TO SEE IF IT IS A DATA OR A
C               SENTINEL TYPE RECORD.
C             C.IF IT IS A DATA RECORD,THE PASS NO. OF EACH SATELLITE
C               DATA ITEM IN THE RECORD(READIN(N),N=21,231,21) IS
C               CHANGED AND READIN IS WRITTEN ON THE OUTPUT ORB3A TAPE.
C             D.IF THE RECORD JUST WRITTEN OUT CONTAINS AN ASCENDING
C               NODE CROSSING DATA ITEM(READIN(234).NE.999.),SUBROUTINE
C               ASCEND IS CALLED,CONTROL RETURNS TO MAIN,AN ASCENDING
C               NODE LINE OF INFORMATION JUST PREPARED BY ASCEND IS
C               PRINTED,AND MAIN RETURNS TO THE BEGINNING OF THE LOOP.
C             E.IF THE RECORD JUST WRITTEN OUT DOES NOT CONTAIN AN
C               ASCENDING NODE CROSSING DATA ITEM(READIN(234).EQ.999.),
C               MAIN RETURNS TO THE BEGINNING OF THE LOOP.
C         4.THE PASS NUMBERS IN 3C ABOVE ARE CHANGED IN THE FOLLOWING
C           WAY.VALUE(READ FROM OPTION CARD) REPLACES THE PASS NUMBERS
C           OF ALL SATELLITE DATA ITEMS PRESENTLY AND HENCEFORTH IN THE
C           READIN ARRAY UNTIL AN ASCENDING NODE CROSSING DATA ITEM IS
C           ENCOUNTERED.WHEN ENCOUNTERED VALUE IS INCREMENTED BY ONE AND
C           THE RESULT REPLACES THE PASS NUMBER OF THIS ASCENDING NODE
C           CROSSING DATA ITEM AND THE PASS NUMBERS OF ALL SUBSEQUENT
C           SATELLITE DATA ITEMS PRESENTLY AND HENCEFORTH IN READIN.WHEN
C           ANOTHER ASCENDING NODE ITEM IS FOUND,VALUE IS INCREMENTED BY
C           ONE AND THE ABOVE PROCEDURE IS REPEATED.
C
C     REQUIRED SUBPROGRAMS
C       SUBROUTINE SUBPROGRAMS
C         ASCEND,SUNLGT,SELECT,CHKREC,RWTAP4(ALSO ENTRY POINTS RTAPE4,
C         WTAPE4,WSNECF).
C       FUNCTION SUBPROGRAMS
C         THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION,FLOAT
C     LANGUAGE AND SYSTEM
C       MAIN HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C       LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C     PROGRAMMER
C       ROBERT K.SCHLESSINGER
C       COMPUTER SCIENCES CORPORATION
C       SILVER SPRING,MARYLAND
C     PREPARED FOR
C       GODDARD SPACE FLIGHT CENTER
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                C       NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
                C       GREENBELT, MARYLAND
                C     CONTRACT NUMBER AND COMPLETION DATE
                C       NAS 5-11790, TASK 72, SUBTASK H
                C     COMPLETED ON 7 MAY 1971
                C
                C***  START PROGRAM ***********************************************
                C
 ISN 0002             IMPLICIT REAL*8 (A-H,O-U,W-Z)
 ISN 0003             COMMON          TITLE(256),READIN(256)          ,PERIOD    ,ISAVE(6) ,
                     1                ISET
 ISN 0004             DATA            XCRB3A     ,XNINES / 76799361.D0, 99999999.D0
 ISN 0005             DATA            INCRD      ,JSYOUT / 5, 6 /
                C     TO FACILITATE THE USE OF DEBUGGING TOOLS, ALL *GO TO* AND *CALL*
                C     STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
                C     STATEMENT LABELS FROM 700-899 INCLUSIVE.
                C
 ISN 0006             ISET=0
 ISN 0007             IND=1
 ISN 0008             IWORD=2
                C     READ INPUT TAPE TITLE RECORD.
 ISN 0009       700 CALL RTAPE4(TITLE,IERR)
                C     IF INPUT TAPE IS NOT AN ORB3A TAPE, PRINT APPROPRIATE ERROR MESSAGE
                C     (GO TO 11) AND STOP PROGRAM.
 ISN 0010       702 IF(TITLE(1).NE.XCRB3A) GO TO 11
                C     READ S/360 TELOR3 PROGRAM OPTION CARD.
 ISN 0012             READ(INCRD,1000) KASE,VALUE,TAPEIN
                C     IF THE OPTION SELECTOR(KASE) IS NOT BETWEEN ONE AND FIVE
                C     INCLUSIVE, PRINT APPROPRIATE ERROR MESSAGE AND STOP PROGRAM.
 ISN 0013       704 IF(KASE.LT.1 .OR. KASE.GT. 5) GO TO 8
                C     IF THE CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN FOR
                C     THIS RUN AND THE INPUT PASS NO. IS LESS THAN ONE, PRINT APPROPRIATE
                C     ERROR MESSAGE AND STOP PROGRAM.
 ISN 0015       706 IF(KASE.EQ.2 .AND. VALUE.LT.1.) GO TO 9
                C     START TITLE PAGE FOR S/360 TELOR3 PROGRAM.
 ISN 0017             WRITE(JSYOUT,2000)
 ISN 0018             ISATT=TITLE(2)
 ISN 0019             WRITE(JSYOUT,2010) TAPEIN,ISATT
                C     CONVERT INPUT ORB3A TAPE SATELLITE DATA START AND END TIMES FROM
                C     SECONDS OF DAY(CONTAINED IN TITLE RECORD) TO HOURS, MINUTES,
                C     AND SECONDS.
                C
                C     CONVERT START TIME(SEC) TO HOURS AND FRACTION OF HOURS.
 ISN 0020             READ1=TITLE(6)/3600.
                C     CONVERT END TIME(SEC) TO HOURS AND FRACTION OF HOURS.
 ISN 0021             READ2=TITLE(9)/3600.
                C     *** TRUNCATE START TIME TO HOUR OF DAY ***
 ISN 0022             IREAC1=READ1
                C     *** TRUNCATE END TIME TO HOUR OF DAY ***
 ISN 0023             IREAD2=READ2
                C     CONVERT START HOUR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
 ISN 0024             READ3=FLOAT(IREAD1)
                C     CONVERT END HOUR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
 ISN 0025             READ4=FLOAT(IREAD2)
                C     FIND START TIME FRACTION OF HOURS.
 ISN 0026             READ1=READ1-READ3
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                C     FIND END TIME FRACTION OF HOURS.
ISN 0027              READ2=READ2-READ4
                C     COMPUTE START TIME MINUTES AND FRACTION OF MINUTES.
ISN 0028              READ1=READ1*60.
                C     COMPUTE END TIME MINUTES AND FRACTION OF MINUTES.
ISN 0029              READ2=READ2*60.
                C     *** TRUNCATE START TIME TO MINUTE OF HOUR ***
ISN 0030              IREAD3=READ1
                C     *** TRUNCATE END TIME TO MINUTE OF HOUR ***
ISN 0031              IREAD4=READ2
                C     CONVERT START MINUTE OF HOUR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0032              READ3=FLOAT(IREAD3)
                C     CONVERT END MINUTE OF HOUR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0033              READ4=FLOAT(IREAD4)
                C     FIND START TIME FRACTION OF MINUTES.
ISN 0034              READ1=READ1-READ3.
                C     FIND END TIME FRACTION OF MINUTES.
ISN 0035              READ2=READ2-READ4
                C     COMPUTE REMAINDER OF START TIME SECONDS AND FRACTION OF SECONDS.
ISN 0036              READ1=READ1*60.
                C     COMPUTE REMAINDER OF END TIME SECONDS AND FRACTION OF SECONDS.
ISN 0037              READ2=READ2*60.
                C     *** TRUNCATE START TIME TO SECOND OF MINUTE ***
ISN 0038              IREAD5=READ1
                C     *** TRUNCATE END TIME TO SECOND OF MINUTE ***
ISN 0039              IREAD6=READ2
                C     *** CONVERT START TIME YEAR MONTH DAY FROM REAL TO INTEGER FORMAT.
ISN 0040              IREAD7=TITLE(4)
                C     *** CONVERT END TIME YEAR MONTH DAY FROM REAL TO INTEGER FORMAT.
ISN 0041              IREAD8=TITLE(7)
                C
                C     PRINT ON TITLE PAGE INPUT ORB3A TAPE SATELLITE DATA START AND END
                C     TIMES IN HOURS,MINUTES,AND SECONDS.
ISN 0042              WRITE(JSYOUT,2020) IREAD7,IREAD1,IREAD3,IREAD5,IREAD8,IREAD2,
                     1                   IREAD4,IREAD6
                C     CALL RWTAP4 TO INITIALIZE PROGRAM TO GENERATE AN ORB3A TAPE IF ANY
                C     ONE OF THE THREE OUTPUT TAPE OPTIONS HAS BEEN CHOSEN FOR THIS RUN.
ISN 0043        708   IF(KASE.EQ.2 .OR. KASE.EQ.3 .OR. KASE.EQ.5) CALL RWTAP4
ISN 0045        710   GO TO (21,22,23,24,25),KASE
                C     KASE=1(ASCENDING NODE REPORT OPTION)
ISN 0046         21   WRITE(JSYOUT,2030)
ISN 0047        720   GO TO 304
                C     KASE=2(CHANGE PASS NUMBERS AND REPORT OPTION)
ISN 0048         22   WRITE(JSYOUT,2040)
ISN 0049        730   GO TO 304
                C     KASE=3(SELECT TIME PERIOD OPTION)
ISN 0050         23   WRITE(JSYOUT,2050)
ISN 0051        740   CALL SELECT
ISN 0052        750   GO TO 999
                C     KASE=4(SUNLIGHT REPORT OPTION)
ISN 0053         24   WRITE(JSYOUT,2060)
ISN 0054        760   CALL SUNLGT
ISN 0055        770   GO TO 999
                C     KASE=5(CHECK RECORD OPTION)
ISN 0056         25   WRITE(JSYOUT,2070)
ISN 0057        780   CALL CHKREC
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ISN 0058          790 GO TO 999
ISN 0059           14 IND=2
                C     IF CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN,WRITE THE
                C     TITLE ARRAY AS THE TITLE RECORD ON THE OUTPUT ORB3A TAPE.
ISN 0060          792 IF(KASE.EQ.2) CALL WTAPE4(TITLE)
                C     READ AN INPUT ORB3A DATA OR SENTINEL TYPE RECORD INTO READIN.
ISN 0062            3 CALL RTAPE4(READIN,IERR)
                C     IF RECORD IN READIN IS A SENTINEL TYPE,ALL INPUT ORB3A DATA
                C     RECORDS HAVE BEEN PROCESSED,EXIT READ LOOP(GO TO 10).
ISN 0063        794 IF(READIN(1).EQ.XNINES) GO TO 10
ISN 0065        796 IF(KASE.EQ.2) GO TO 90
                C     IF USING ASCENDING NODE REPORT OPTION AND READIN DOES NOT CONTAIN
                C     AN ASCENDING NODE CROSSING DATA ITEM,READ ANOTHER INPUT RECORD
                C     (GO TO 3).
ISN 0067        798 IF(READIN(234).EQ.999.D0) GO TO 3
                C     IF USING ASCENDING NODE REPORT OPTION AND READIN CONTAINS AN
                C     ASCENDING NODE CROSSING DATA ITEM,CALL SUBROUTINE ASCEND
                C     (GO TO 400).
ISN 0069        800 GO TO 400
                C     IF HERE,CHANGE PASS NUMBERS AND REPORT OPTION HAS BEEN CHOSEN.
                C
                C     CHANGE PASS NUMBERS OF RECORD IN READIN WITH FOLLOWING DO LOOP.
ISN 0070         90 DO 100 N=21,231,21
ISN 0071            IF(READIN(N-20).EQ.2.D0) VALUE=VALUE+1.
ISN 0073            READIN(N)=VALUE
ISN 0074        100 CONTINUE
                C     WRITE ON OUTPUT ORB3A THE READIN ARRAY CONTAINING CHANGED PASS
                C     NUMBERS.
ISN 0075        810 CALL WTAPE4(READIN)
                C     IF THE RECORD JUST WRITTEN ON OUTPUT ORB3A CONTAINS AN ASCENDING
                C     NODE CROSSING DATA ITEM,CALL SUBROUTINE ASCEND(GO TO 400).
ISN 0076        812 IF(READIN(234).NE.999.D0) GO TO 400
                C     GO TO BEGINNING OF READ LOOP AND READ ANOTHER INPUT RECORD
                C     INTO READIN.
ISN 0078        820 GO TO 3
                C     PRINT COLUMN HEADINGS FOR ASCENDING NODE REPORT(REQUIRED
                C     FOR EITHER ASCENDING NODE OPTION OR CHANGE PASS NUMBERS AND
                C     REPORT OPTION).
ISN 0079        304 ICOUNT=4
ISN 0080            WRITE(JSYOUT,2080)
ISN 0081            WRITE(JSYOUT,2090)
ISN 0082            WRITE(JSYOUT,2100)
                C     IF THIS IS NOT THE FIRST TIME ASCENDING NODE REPORT COLUMN
                C     HEADINGS HAVE BEEN PRINTED,PRINT ASCENDING NODE LINE OF
                C     INFORMATION JUST PREPARED BY SUBROUTINE ASCEND(GO TO 501).
ISN 0083        822 IF (IND.NE.1) GO TO 501
                C     GO TO BEGINNING OF READ LOOP FOR ASCENDING NODE REPORT OPTION OR
                C     PASS NO. OPTION.
ISN 0085        830 GO TO 14
                C     CALL SUBROUTINE ASCEND TO PREPARE AN ASCENDING NODE LINE OF
                C     INFORMATION.
ISN 0086        400 CALL ASCEND
ISN 0087            ICOUNT=ICOUNT+1
                C     IF LINE COUNTER .GT. 48 PRINT ASCENDING NODE COLUMN HEADINGS ON A
                C     NEW PAGE(GO TO 304).
ISN 0088        832 IF (ICOUNT.GT.48) GO TO 304
```

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C     PRINT OUT ASCENDING NODE LINE OF INFORMATION PREPARED BY ASCEND.
ISN 0090      501 WRITE(JSYOUT,2110) ISAVE(1),ISAVE(2),ISAVE(3),ISAVE(4),ISAVE(5),
     1                ISAVE(6),PERIOD
C     GO TO BEGINNING OF READ LOOP AND READ ANOTHER INPUT RECORD.
ISN 0091      840 GO TO 3
ISN 0092       10 CONTINUE
C     IF ASCENDING NODE REPORT OPTION,PRINT NORMAL TERMINATION MESSAGE
C     (GO TO 200).
ISN 0093      842 IF(KASE.EQ.1) GO TO 200
C     IF HERE,USING PASS NO. OPTION.
C     CREATE SENTINEL RECORD.
ISN 0095          TITLE(1)=XNINES
C     IF READIN CONTAINS A SENTINEL ITEM RECORD,SET IWORD=1 .
ISN 0096          IF(READIN(2).EQ.XNINES) IWORD=1
C     CALL WSNEOF TO WRITE SENTINEL TYPE RECORDS AND AN END OF FILE(EOF)
C     ON OUTPUT ORB3A TAPE.
C     IF IWORD=2,WSNEOF WRITES 2 SENTINEL RECORDS AND AN EOF.
C     IF IWORD=1,WSNECF WRITES 1 SENTINEL ITEM RECORD,2 SENTINEL
C     RECORDS,AND AN EOF.
ISN 0098      850 CALL WSNEOF(READIN,TITLE,IWORD)
ISN 0099          WRITE(JSYOUT,2130)
ISN 0100      860 GO TO 999
ISN 0101      200 CONTINUE
ISN 0102          WRITE(JSYOUT,2120)
ISN 0103      870 GO TO 999
ISN 0104        8 WRITE(JSYOUT,2150)
ISN 0105      880 GO TO 999
ISN 0106        9 WRITE(JSYOUT,2160)
ISN 0107      890 GO TO 999
ISN 0108       11 WRITE(JSYOUT,2140)
ISN 0109     1000 FORMAT(I1,8X,F6.1,4X,A6)
ISN 0110     2000 FORMAT(1H1,//////////////////////)
ISN 0111     2010 FORMAT(1H ,20X,51HS/360 TELCR3 PROGRAM(TEST,EDIT,AND LIST ORB3A TA
     1PE)/1H0,20X,24HINPUT ORB3A TAPE NO. IS ,A6,2X,44HSATELLITE ID ON I
     2NPUT ORB3A TITLE RECORD IS ,I7)
ISN 0112     2020 FORMAT(1H0,60X, 4HDATE,3X,2HHR,2X,3HMIN,2X,3HSEC/
     1 1H ,20X,37HINPUT ORB3A SATELLITE DATA START TIME,2X,I6,2X,I2,2X,
     2 I2,3X,I2/
     3 1H ,20X,35HINPUT ORB3A SATELLITE DATA END TIME,4X,I6,2X,I2,2X,I2,
     4 3X,I2)
ISN 0113     2030 FORMAT(1H0,20X, 48HASCENDING NODE REPORT OPTION CHOSEN FOR THIS RU
     1N)
ISN 0114     2040 FORMAT(1H0,20X, 57HCHANGE PASS NUMBERS AND REPORT OPTION CHOSEN FO
     1R THIS RUN)
ISN 0115     2050 FORMAT(1H0,20X, 45HSELECT TIME PERIOD OPTION CHOSEN FOR THIS RUN)
ISN 0116     2060 FORMAT(1H0,20X, 42HSUNLIGHT REPORT OPTION CHOSEN FOR THIS RUN)
ISN 0117     2070 FORMAT(1H0,20X, 39HCHECK REGORD OPTION CHOSEN FOR THIS RUN)
ISN 0118     2080 FORMAT(1H1,//)
ISN 0119     2090 FORMAT(1H ,19X,8HPASS NO.,26X,14HASCENDING NODE,26X,6HPERIOD)
ISN 0120     2100 FORMAT(1H ,46X,5HDATE ,1X,9HDAY OF YR,2X,2HHR,1X,3HMIN,1X,3HSEC,
     1          20X,7HMINUTES)
ISN 0121     2110 FORMAT(1H ,20X,I5,20X,I6,4X,I3,5X,I2,2X,I2,2X,I2,18X,F8.2)
ISN 0122     2120 FORMAT(1H0,19X, 51HNORMAL TERMINATION OF ASCENDING NODE REPORT OPT
     1ION.)
ISN 0123     2130 FORMAT(1H0,19X, 60HNORMAL TERMINATION OF CHANGE PASS NUMBERS AND R
     1EPORT OPTION.)
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ISN 0124      2140 FORMAT(1H0,78H**DATA IDENTIFICATION ON TAPE IS NOT ORB3A**  **CHEC
             1K TAPE NO. AND TRY AGAIN**)
ISN 0125      2150 FORMAT(1H0,70HOPTION SELECTER IS NOT BETWEEN 1 AND 5 INCLUSIVE.EXE
             1CUTION TERMINATED.)
ISN 0126      2160 FORMAT(1H0,112HINPUT PASS NO. CAN NOT BE LESS THAN 1 WHEN USING TH
             1E CHANGE PASS NUMBERS AND REPORT OPTION.EXECUTION TERMINATED.)
ISN 0127      999 STOP
ISN 0128            END
```

```
SYMBOL  INTERNAL STATEMENT NUMBERS
N       0070  0071  0072
IND     0007  0059  0063
IERR    0009  0062
ISET    0003  0006
KASE    0012  0013  0013  0015  0043  0043  0043  0045  0060  0065  0093
FLOAT   0024  0025  0032  0033
INCRD   0005  0012
ISATT   0018  0019
ISAVE   0003  0090  0090  0090  0090  0090  0090
INCRD   0009  0056  0058
READ1   0020  0022  0026  0026  0028  0028  0030  0034  0034  0036  0036  0038
READ2   0021  0023  0027  0027  0029  0029  0031  0035  0035  0037  0037  0039
READ3   0024  0026  0032  0034
READA   0025  0027  0033  0035
TITLE   0003  0005  0010  0018  0020  0021  0040  0041  0060  0095  0098
VALUE   0012  0015  0071  0071  0073
ASCEND  0026
CHKREC  0057
ICOUNT  0079  0087  0087  0088
IREAD1  0022  0024  0042
IREAD2  0023  0025  0042
IREAD3  0030  0032  0042
IREAD4  0031  0033  0042
IREAD5  0038  0042
IREAD6  0039  0042
IREAD7  0040  0042
IREAD8  0041  0042
JSYOUT  0005  0017  0019  0042  0046  0048  0050  0053  0056  0080  0081  0082  0090  0099  0102  0104  0106  0108
PERIOD  0003  0050
READIN  0003  0062  0063  0067  0071  0073  0075  0076  0096  0098
RTAPE4  0009  0062
RWTAP4  0043
SELECT  0051
SUMLGT  0054
TAPEIN  0012  0019
WSNEOF  0098
WTAPE4  0060  0075
XNINES  000A  0062  0095  0096
XCRB3A  000A  0010
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
3	0062	0067 0078 0091
8	0104	0013
9	0106	0015
10	0092	0063
11	0108	0010
14	0059	0085
21	0046	0045
22	0048	0045
23	0050	0045
24	0053	0045
25	0056	0045
90	0070	0065
100	0074	0070
200	0101	0093
304	0079	0047 0049 0088
400	0086	0069 0076
501	0090	0083
700	0009	
702	0010	
704	0013	
706	0015	
708	0043	
710	0045	
720	0047	
730	0049	
740	0051	
750	0052	
760	0054	
770	0055	
780	0057	
790	0058	
792	0060	
794	0063	
796	0065	
798	0067	
800	0069	
810	0075	
812	0076	
820	0078	
822	0083	
830	0085	
832	0088	
840	0091	
842	0093	
850	0098	
860	0100	
870	0103	
880	0105	
890	0107	
999	0127	0052 0056 0058 0100 0103 0105 0107
1000	0109	0012
2000	0110	0017
2010	0111	0019
2020	0112	0042

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
2030	0113	0046
2040	0114	0048
2050	0115	0050
2060	0116	0053
2070	0117	0056
2080	0118	0060
2090	0119	0081
2100	0120	0082
2110	0121	0050
2120	0122	0102
2130	0123	0059
2140	0124	0108
2150	0125	0104
2160	0126	0106

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
N	SF	I*4	0005B4	IND	S	I*4	0005B8	IERR	SFA	I*4	0005BC	ISET	S C	I*4	001020
KASE	SF	I*4	0005C0	INCRD	F	I*4	0005C4	ISATT	SF	I*4	0005C8	ISAVE	F C	I*4	001008
IWORD	SFA	I*4	0005CC	READ1	SF	R*8	000600	READ2	SF	R*8	000608	RFAD3	SF	R*8	000610
READ4	SF	R*8	000618	TITLE	SFA C	R*8	000000	VALUE	SF	R*4	0005D0	ASCEND	SF XF	R*8	000000
CHKREC	SF XF	R*8	000000	IBCOM=	F XF	I*4	000000	ICOUNT	SF	I*4	0005D4	IREAD1	SFA	I*4	0005D8
IREAD2	SFA	I*4	0005DC	IREAD3	SFA	I*4	0005E0	IREAD4	SFA	I*4	0005E4	IREAD5	SF	I*4	0005E8
IREAD6	SF	I*4	0005EC	IREAD7	SF	I*4	0005F0	IREAD8	SF	I*4	0005F4	JSYOUT	F	I*4	0005F8
PERIOD	F C	R*8	001000	READIN	SFA C	R*8	000800	RTAPE4	SF XF	R*8	000000	RWTAP4	SF XF	R*8	000000
SELECT	SF XF	R*8	000000	SUNLGT	SF XF	R*8	000000	TAPE-IN	SF	R*8	000620	WSNEOF	SF XF	R*8	000000
WTAPE4	SF XF	R*8	000000	XNINES	F	R*8	000628	XORB3A		R*8	000630				

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
TITLE	R*8	000000	READIN	R*8	000800	PERIOD	R*8	001000	ISAVE	I*4	001008
ISET	I*4	001020									

```
 LABEL   ADDR      LABEL   ADDR      LABEL   ADDR      LABEL   ADDR

 700  000738 NR    702  00074A NR    704  000788 NR    706  0007A4
 708  000AD0 NR    710  000B06       21   000B20       720  000B34 NR
  22  000B3A       730  000B50 NR    23   000B56       740  000B6C NR
 750  000B78 NR     24  000B7E       760  000B94 NR    770  000BA0 NR
  25  000BA6       780  000BBC NR    790  000BC8 NR     14  000BCE
 792  000BD6 NR      3  000BF2       79A  000C00 NR    796  000C12
 798  000C20       800  000C32       90   000C38      100  000C84
 810  000C9A       812  000CA8 NR    820  000C8A      304  000CC0
 822  000D04 NR    830  000D12       400  000D18      832  000D30 NR
 501  000D3E       840  000D90 NR     10  000D96      842  000D96 NR
 850  000DC6       860  000DE8 NR    200  000DEE      870  000E04 NR
   8  000E0A       880  000E20 NR     9  000E26      890  000E3C NR
  11  000E42       900  000E58

 *OPTIONS IN EFFECT*    NAME=MAIN,OPT=00,LINECNT=58,SIZE=0000K,

 *OPTIONS IN EFFECT*    SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

  *STATISTICS*      SOURCE-STATEMENTS =  127,PROGRAM-SIZE =  3718

 *STATISTICS*  NO DIAGNOSTICS GENERATED

 ****** END OF COMPILATION ******  105K BYTES OF CORE NOT USED
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LEVEL 19 ( JUNE 70 )                    OS/360 FORTRAN H                    DATE 71.158/11.43.51

          COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                            SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002           SUBROUTINE ASCEND
                C   PURPOSE
                C     SUBROUTINE ASCEND ISOLATES WHICH SATELLITE DATA ITEM IN AN ORB3A
                C     DATA RECORD IS OF THE ASCENDING NODE CROSSING TYPE AND USES DATA
                C     FROM THIS ASCENDING ITEM TO PRODUCE AND STORE ONE LINE OF
                C     INFORMATION FOR THE BCD OUTPUT OF AN ASCENDING NODE REPORT.
                C   CALLING SEQUENCE
                C     CALL ASCEND
                C     THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
                C   INPUT(THROUGH COMMON)
                C     ISET    = FLAG(INITIALLY SET BY MAIN) USED TO DETERMINE PROPER
                C               EQUATION FOR CALCULATING PERIOD BETWEEN SUCCESSIVE
                C               PASS NUMBERS(ASCENDING NODE CROSSING DATA ITEMS).
                C               =0,PERIOD=0.(FOR FIRST PASS NO. ONLY)
                C               =1,PERIOD=GENERAL CALCULATION(FOR ALL PASS NUMBERS
                C                 AFTER THE FIRST)
                C     READIN  = A 256 WORD ARRAY(INPUT FROM MAIN) CORRESPONDING TO AN
                C               ORB3A DATA RECORD WITH AN ASCENDING NODE CROSSING DATA
                C               ITEM.
                C   OUTPUT(THROUGH COMMON)
                C     ISAVE   = A SIX WORD ARRAY(USED BY MAIN) CONTAINING SIX OF THE
                C               SEVEN VARIABLES NEEDED FOR ONE LINE OF INFORMATION IN
                C               AN ASCENDING NODE REPORT.
                C               ISAVE(1) = PASS NUMBER (OF PRESENT ASCENDING NODE
                C                          CROSSING DATA ITEM)
                C               ISAVE(2) = PASS NUMBER YEAR-MONTH-DAY
                C               ISAVE(3) = PASS NUMBER DAY OF YEAR
                C               ISAVE(4) = PASS NUMBER HOUR OF DAY
                C               ISAVE(5) = PASS NUMBER MINUTE OF HOUR
                C               ISAVE(6) = PASS NUMBER SECOND OF MINUTE
                C     PERIOD  = PERIOD OF TIME(MINUTES) BETWEEN SUCCESSIVE PASS NUMBERS
                C               (USED BY MAIN).SEVENTH AND LAST VARIABLE NEEDED FOR ONE
                C               LINE OF INFORMATION IN AN ASCENDING NODE REPORT.
                C   MAJOR VARIABLES(IN ADDITION TO ABOVE)
                C     C1        = USED TO SAVE DAY OF YEAR OF PRESENT ASCENDING
                C                 NODE CROSSING DATA ITEM.BECOMES DAY OF YEAR OF
                C                 PREVIOUS CROSSING ITEM WHEN CALCULATING PERIOD.
                C     C2        = USED TO SAVE SECONDS OF DAY OF PRESENT ASCENDING
                C                 NODE CROSSING DATA ITEM.BECOMES SECONDS OF DAY OF
                C                 PREVIOUS CROSSING ITEM WHEN CALCULATING PERIOD.
                C     I YEAR    = USED TO SAVE YEAR OF PRESENT ASCENDING NODE
                C                 CROSSING DATA ITEM.BECOMES YEAR OF PREVIOUS
                C                 CROSSING ITEM WHEN CALCULATING PERIOD.
                C     READIN(N-20) = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN
                C                 SATELLITE DATA ITEMS IN ORB3A RECORD.
                C                 =1,REGULAR SATELLITE DATA ITEM.
                C                 =2,ASCENDING NODE CROSSING DATA ITEM.
                C                 =3,NORTH POINT DATA ITEM.
                C                 =4,DESCENDING NODE DATA ITEM.
                C                 =5,SOUTH POINT DATA ITEM.
                C                 =6,SUNLIGHT ENTRANCE DATA ITEM.
                C                 =7,SUNLIGHT EXIT DATA ITEM.
                C     READIN(N-19) = YEAR-MONTH-DAY OF PRESENT ASCENDING NODE CROSSING
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C                    DATA ITEM.
C       READIN(N-18) = DAY OF YEAR OF PRESENT ASCENDING NODE CROSSING
C                    DATA ITEM.
C       READIN(N-17) = SECONDS OF DAY OF PRESENT ASCENDING NODE CROSSING
C                    DATA ITEM.
C     REFERENCE
C       IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,"ORBITAL
C       DETERMINATION UTILITY PROGRAMS,""CONTRACT NAS 5-10022,MARCH 1970
C       (TELOR3 PROGRAM SECTION)
C     METHOD
C       SUBROUTINE ASCEND ISOLATES WHICH DATA ITEM IN AN ORB3A DATA
C       RECORD IS OF THE ASCENDING NODE TYPE BY EXAMINING THE TYPE
C       INDICATOR(FIRST WORD) OF EACH OF THE ELEVEN SATELLITE DATA ITEMS
C       IN THE RECORD(READIN(N-20),N=21,231,21).WHEN THE FIRST WORD OF A
C       SATELLITE DATA ITEM CONTAINS A TYPE INDICATOR EQUAL TO 2.,THE
C       ASCENDING NODE CROSSING DATA ITEM HAS BEEN FOUND.THE PASS NO.,
C       YEAR MONTH DAY,DAY OF YEAR,AND TIME(HRS,MIN,SEC) OF THIS
C       ASCENDING NODE ARE STORED IN ISAVE.THE TIME IN MINUTES BETWEEN
C       THIS ASCENDING NODE AND THE LAST PREVIOUS ASCENDING NODE IS
C       CALCULATED AND STORED IN PERIOD.ISAVE AND PERIOD NOW CONTAIN
C       DATA FOR ONE LINE OF INFORMATION FOR AGS OUTPUT OF THE ASCENDING
C       NODE REPORT.
C     REQUIRED SUBPROGRAMS
C       SUBROUTINE SUBPROGRAMS
C         NO SUBROUTINES ARE CALLED BY ASCEND.
C       FUNCTION SUBPROGRAMS
C         THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTIONS FLOAT,MOD
C     LANGUAGE AND SYSTEM
C       ASCEND HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C       LEVEL OF ZERO, ON THE IBM 360/95 USING RELEASE 19.
C     PROGRAMMER
C       ROBERT K.SCHLESSINGER
C       COMPUTER SCIENCES CORPORATION
C       SILVER SPRING,MARYLAND
C     PREPARED FOR
C       GODDARD SPACE FLIGHT CENTER
C       NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C       GREENBELT,MARYLAND
C     CONTRACT NUMBER AND COMPLETION DATE
C       NAS 5-11790,TASK 72,SUBTASK H
C       COMPLETED ON 7 MAY 1971
C
C***  START PROGRAM  ************************************************
C
ISN 0003            IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004            COMMON          TITLE(256),READIN(256)      ,PERIOD    ,ISAVE(6) ,
                   1                ISET
C     TO FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GO TO* AND *CALL*
C     STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C     STATEMENT LABELS FROM 700-899 INCLUSIVE.
C     THE *RETURN* STATEMENT(NOT REFERENCED INITIALLY) HAS BEEN ASSIGNED
C     THE LABEL 999 .
C
C     ISOLATE WHICH SATELLITE DATA ITEM IN READIN IS OF THE ASCENDING
C     NODE CROSSING TYPE.
ISN 0005            DO 100 N=21,231,21
```

```
C      IF TYPE INDICATOR OF KTH OF ELEVEN DATA ITEMS IN READIN EQUALS 2.,
C      THE ASCENDING NODE CROSSING ITEM HAS BEEN FOUND.STORE DATA
C      PERTAINING TO THIS ASCENDING ITEM(GO TO 110).
ISN 0006      700 IF(READIN(N-20).EQ.2.D0) GO TO 110
ISN 0008      100 CONTINUE
C      STORE PASS NO. OF THIS ASCENDING ITEM.
ISN 0009      110 ISAVE(1)=READIN(N)
C      STORE YEAR-MONTH-DAY OF THIS ASCENDING ITEM.
ISN 0010      ISAVE(2)=READIN(N-19)
C      STORE DAY OF YEAR OF THIS ASCENDING ITEM.
ISN 0011      ISAVE(3)=READIN(N-18)
C      CONVERT ASCENDING ITEM TIME(SEC OF DAY) TO HOUR OF DAY(INCLUDES
C      ANY FRACTION).
ISN 0012      READ1=READIN(N-17)/3600.
C      *** TRUNCATE ASCENDING ITEM TIME TO HOUR OF DAY(DROPS FRACTION).
ISN 0013      ISAVE(4)=READ1
C      CONVERT ASCENDING ITEM HOUR OF DAY TO REAL FORMAT WITHOUT ROUND
C      OFF.
ISN 0014      READ2=FLOAT(ISAVE(4))
C      FIND ASCENDING ITEM FRACTIONAL HOUR OF DAY.
ISN 0015      READ1=READ1-READ2
C      CONVERT ASCENDING ITEM FRACTIONAL HOUR OF DAY TO MINUTE OF HOUR
C      (INCLUDES ANY FRACTION).
ISN 0016      READ1=READ1*60.
C      *** TRUNCATE ASCENDING ITEM TIME TO MINUTE OF HOUR(DROPS FRACTION)
ISN 0017      ISAVE(5)=READ1
C      CONVERT ASCENDING ITEM MINUTE OF HOUR TO REAL FORMAT WITHOUT
C      ROUND OFF.
ISN 0018      READ2=FLOAT(ISAVE(5))
C      FIND ASCENDING ITEM FRACTIONAL MINUTE OF HOUR.
ISN 0019      READ1=READ1-READ2
C      CONVERT ASCENDING ITEM FRACTIONAL MINUTE OF HOUR TO SECOND OF
C      MINUTE(INCLUDES ANY FRACTION).
ISN 0020      READ1=READ1*60.
C      *** TRUNCATE ASCENDING ITEM TIME TO SECOND OF MINUTE
C          (DROPS FRACTION).
ISN 0021      ISAVE(6)=READ1
C      IF THIS IS FIRST ASCENDING ITEM FOUND ON OR83A TAPE,SET PERIOD
C      TO ZERO(GO TO 199).
ISN 0022      710 IF (ISET.EQ.0) GO TO 199
C      STORE DAY OF YEAR OF PRESENT ASCENDING ITEM.
ISN 0024      DATE=READIN(N-18)
C      IF END OF YEAR WAS CROSSED BETWEEN PRESENT AND PREVIOUS ASCENDING
C      ITEM AND YEAR OF PREVIOUS ASCENDING ITEM WAS A LEAP YEAR,ADD 366
C      TO DAY OF YEAR OF PRESENT ASCENDING ITEM(DATE).
ISN 0025      IF(READIN(N-18).LT.C1.AND.MOD(IYEAR,4).EQ.0) DATE=DATE+366.
C      IF END OF YEAR WAS CROSSED BETWEEN PRESENT AND PREVIOUS ASCENDING
C      ITEM AND YEAR OF PREVIOUS ASCENDING ITEM WAS NOT A LEAP YEAR.
C      ADD 365 TO DAY OF YEAR OF PRESENT ASCENDING ITEM(DATE).
ISN 0027      IF(READIN(N-18).LT.C1.AND.MOD(IYEAR,4).NE.0) DATE=DATE+365.
C      CALCULATE TIME BETWEEN SUCCESSIVE PASS NUMBERS(ASCENDING ITEMS).
C      PERIOD=PRESENT MINUS PREVIOUS ASCENDING ITEM DAY OF YEAR(CONVERT
C             RESULT TO SEC) LESS PREVIOUS ASCENDING ITEM SEC OF DAY PLUS
C             PRESENT ASCENDING ITEM SEC OF DAY.RESULTING SEC ARE DIVIDED
C             BY 60 TO OBTAIN PERIOD IN MINUTES.
ISN 0029      PERIOD=(((DATE-C1)*86400.)-C2+READIN(N-17))/60.
```

```
C     IF HERE,PERIOD SHOULD NOT BE ZEROED(GO TO 200).
ISN 0030      720 GO TO 200
ISN 0031      199 PERIOD=0.
C     STORE PRESENT ASCENDING ITEM DAY OF YEAR,SECONDS OF DAY,AND YEAR.
C     BECOME DATA FOR PREVIOUS ASCENDING ITEM WHEN CALCULATING PERIOD.
ISN 0032      200 C1=READIN(N-18)
ISN 0033          C2=READIN(N-17)
ISN 0034          IYEAR=READIN(N-19)/10000.
C     THIS IS SET TO 1 AFTER FIRST ASCENDING ITEM IS FOUND AND PERIOD
C     ZERCED.FUTURE PERIODS WILL BE CALCULATED WITH GENERAL EQUATION.
ISN 0035          ISET=1
ISN 0036      999 RETURN
ISN 0037          END
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS												
N	0005	0006	0009	0010	0011	0012	0024	0025	0027	0029	0032	0033	0034
C1	0025	0027	0029	0032									
C2	0029	0033											
MOD	0025	0027											
DATE	0024	0026	0025	0027	0027	0029							
ISET	0004	0026	0035										
FLOAT	0014	0018											
ISAVE	0004	0005	0010	0011	0013	0014	0017	0018	0021				
IYEAR	0025	0027	0034										
READ1	0012	0013	0015	0015	0016	0016	0017	0019	0019	0020	0020	0021	
READ2	0014	0015	0018	0019									
TITLE	0004												
ASCEND	0002												
PERIOD	0004	0025	0031										
READIN	0004	0006	0009	0010	0011	0012	0024	0025	0027	0029	0032	0033	0034

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
100	0008	0005
110	0009	0006
199	0031	0022
200	0032	0020
700	0006	
710	0022	
720	0030	
999	0036	

/ ASCEND / SIZE OF PROGRAM 0004E2 HEXADECIMAL BYTES PAGE 007

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
N	SF	I*4	000114	C1	SF	R*8	000120	C2	SF	R*8	000128	DATE	SF	R*8	000130
ISET	S C	I*4	001020	ISAVE	SFA C	I*4	001008	IYEAR	S A	I*4	000118	READ1	SF	R*8	000138
READ2	SF	N*8	000140	TITLE	C	R*8	N.R.	ASCEND		R*8	000148	PERIOD	S C	R*8	001000
READIN	F C	R*8	000800												

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
TITLE	R*8	N.R.	READIN	R*8	000800	PERIOD	R*8	001000	ISAVE	I*4	001008
ISET	I*4	001020									

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   LABEL     ADDR        LABEL     ADDR        LABEL     ADDR        LABEL     ADDR

    700    0001A4         100    0001BE         110    0001D4         710    000380 NR
    720    000448 NR      199    00044E         200    00045A         999    0004BC NR

*OPTIONS IN EFFECT*     NAME=  MAIN,OPT=00,LINECNT=58,SIZE=0000K,

*OPTIONS IN EFFECT*     SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

*STATISTICS*     SOURCE STATEMENTS =      36 ,PROGRAM SIZE =      1250

*STATISTICS*  NO  DIAGNOSTICS GENERATED

****** END OF COMPILATION ******                          113K BYTES OF CORE NOT USED
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LEVEL 19 ( JUNE 70 )          OS/360  FORTRAN H                    DATE  71.158/11.43.55

      COMPILER OPTIONS - NAME=  MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                         SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002            SUBROUTINE SELECT
                C    PURPOSE
                C      SUBROUTINE SELECT IS USED TO SELECT ANY PERIOD OF DATA PRESENT
                C      ON AN INPUT BINARY ORB3A TAPE AND WRITE THIS PERIOD ON AN OUTPUT
                C      BINARY ORB3A TAPE TOGETHER WITH A REVISED TITLE RECORD
                C      CONTAINING THE START AND END TIMES OF THE SELECTED PERIOD.
                C    CALLING SEQUENCE
                C      CALL SELECT
                C      THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
                C    INPUT(THROUGH COMMON)
                C      TITLE = A 256 WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.
                C    OUTPUT(THROUGH COMMON)
                C      NONE.
                C    MAJOR VARIABLES(IN ADDITION TO ABOVE)
                C      EN              = REQUESTED END YEAR-MONTH-DAY(YRMODY),FLOAT, PT.
                C      ESEC            = REQUESTED END SECONDS OF DAY.
                C      IDATE           = INDICATES IF REQUESTED START YRMODY HAS BEEN
                C                        FOUND.
                C                        =0,NOT FOUND YET.
                C                        =1,FOUND AT LEAST ONCE.
                C      IDISK           = FORTRAN LOGICAL UNIT NO. FOR SCRATCH DISK(14).
                C      IEHR            = REQUESTED END HRS AND MIN(READ FROM PERIOD
                C                        SELECT CARD).
                C      IEN             = REQUESTED END YRMODY(READ FROM PERIOD SELECT
                C                        CARD).
                C      IENREC          = LAST ORB3A DATA RECORD ON DISK TO BE COPIED
                C                        ONTO OUTPUT ORB3A TAPE.
                C      IERR            = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS
                C                        ENCOUNTERED IN READING AN INPUT ORB3A RECORD.
                C                        =0,NO UNUSUAL CONDITIONS.
                C                        =1,END-OF-FILE.
                C                        =4,PERMANENT READ ERROR.DATA RETURNED BUT ITS
                C                           VALIDITY IS QUESTIONABLE.
                C      IFILL           = INDICATES IF LAST DATA RECORD ON INPUT ORB3A
                C                        TAPE HAS 11 VALID SATELLITE DATA ITEMS.
                C                        =0,RECORD NOT FILLED WITH 11 VALID DATA ITEMS.
                C                        =11,RECORD FILLED WITH 11 VALID DATA ITEMS.
                C      IHR             = REQUESTED START HRS AND MIN(READ FROM PERIOD
                C                        SELECT CARD).
                C      INCRD           = FORTRAN LOGICAL UNIT NO. FOR CARD READER(5).
                C      IRECRD          = COUNTS ORB3A DATA RECORDS READ FROM DISK.
                C      IST             = REQUESTED START YRMODY(READ FROM PERIOD
                C                        SELECT CARD).
                C      ISTREC          = 1ST ORB3A DATA RECORD ON DISK TO BE COPIED
                C                        ONTO OUTPUT ORB3A TAPE.
                C      IWORD           = FLAG USED IN WSNEOF(AN ENTRY PT. TO SUBROUTINE
                C                        RWTAP4) FOR BRANCHING.
                C                        =1,WSNEOF WRITES ONE SENTINEL ITEM RECORD.
                C                           2 SENTINEL RECORDS,AND AN END-OF-FILE ON
                C                           OUTPUT ORB3A TAPE.
                C                        =2,WSNEOF WRITES 2 SENTINEL RECORDS AND AN
                C                           END-OF-FILE ON OUTPUT ORB3A TAPE.
                C      JSYOUT          = FORTRAN LOGICAL UNIT NO.FOR SYSTEM PRINTER(6).
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```
C        LDATE          = INDICATES IF REQUESTED END YRMODY HAS BEEN
C                         FOUND.
C                         =0,NOT FOUND YET.
C                         =1,FOUND AT LEAST ONCE.
C        NCEND          = INDICATES IF REQUESTED END TIME(YRMODY AND SEC)
C                         HAS BEEN FOUND.
C                         =0,FOUND.
C                         =1,NOT FOUND.
C        READIN         = A 256 WORD ARRAY CONTAINING AN ORB3A DATA
C                         RECORD,SENTINEL ITEM RECORD,CR SENTINEL RECORD.
C        READIN(2)      = YRMODY OF 1ST SATELLITE DATA ITEM IN ORB3A
C                         DATA RECORD.
C        READIN(3)      = DAY OF YR OF 1ST SATELLITE DATA ITEM IN ORB3A
C                         DATA RECORD.
C        READIN(4)      = SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN
C                         ORB3A DATA RECORD.
C        READIN(212)    = YRMODY OF LAST SATELLITE DATA ITEM IN ORB3A
C                         DATA RECORD.
C        READIN(214)    = SECONDS OF DAY OF LAST SATELLITE DATA ITEM IN
C                         ORB3A DATA RECORD.
C        READIN(I)      = TYPE INDICATOR OF NTH OF 11 SATELLITE DATA
C                         ITEMS IN ORB3A DATA RECORD.CHECKED FOR 99999999
C                         TO SEE IF LAST DATA RECORD ON INPUT ORB3A TAPE
C                         HAS 11 VALID DATA ITEMS.
C        READIN(LSDD)   = SECONDS OF DAY OF LAST VALID DATA ITEM IN LAST
C                         DATA RECORD ON INPUT ORB3A TAPE.
C        READIN(LYRMDY) = YRMODY OF LAST VALID DATA ITEM IN LAST DATA
C                         RECORD ON INPUT ORB3A TAPE.
C        SSEC           = REQUESTED START SECONDS OF DAY.
C        ST             = REQUESTED START YRMODY,FLOAT. PT.
C        TITLE(4)       = SATELLITE DATA START TIME YRMODY.
C        TITLE(5)       = SATELLITE DATA START TIME DAY OF YR.
C        TITLE(6)       = SATELLITE DATA START TIME SECONDS OF DAY.
C        TITLE(7)       = SATELLITE DATA END TIME YRMODY.
C        TITLE(8)       = SATELLITE DATA END TIME DAY OF YR.
C        TITLE(9)       = SATELLITE DATA END TIME SECONDS OF DAY.
C     REFERENCE
C        IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,''ORBITAL
C        DETERMINATION UTILITY PROGRAMS,''CONTRACT NAS 5-10022,MARCH 1970
C        (TELOR3 PROGRAM SECTION)
C     METHOD
C        BACKSPACING AND/OR REWINDING A 7-TRACK BINARY INPUT ORB3A TAPE
C        IS NOT ALLOWED WHEN USING THE SPECIAL PURPOSE FORTRAN LIBRARY
C        SUBROUTINE,DBFOR,WHICH IS REQUIRED FOR READING THIS INPUT TAPE
C        WITH THE S/360 SERIES OF COMPUTERS(SEE SUBROUTINE RWTAP4).SINCE
C        THE CAPABILITY IS DESIRED IN SUBROUTINE SELECT FOR BACKSPACING
C        AND/OR REWINDING THE INFORMATION CONTAINED IN THE DATA RECORDS
C        ON AN INPUT ORB3A TAPE,SUBROUTINE SELECT COPIES ONTO A SCRATCH
C        DISK THE INPUT ORB3A DATA RECORDS UP THROUGH THE 1ST SENTINEL
C        RECORD OR THROUGH THE SENTINEL ITEM RECORD WHICHEVER THE CASE
C        MAY BE(THE ORB3A TITLE RECORD HAS BEEN PREVIOUSLY READ INTO THE
C        TITLE ARRAY BY MAIN AND TITLE IS AVAILABLE TO SELECT WHEN
C        NEEDED).THE DISK IS REWOUND AND THE REQUESTED PERIOD START AND
C        END TIMES ARE READ FROM THE SELECT PERIOD INPUT CARD.DATA
C        RECORDS ARE READ FROM THE DISK,COUNTED,EXAMINED,AND WHEN THE
C        REQUESTED START TIME IS FOUND THE NO. OF THE RECORD CONTAINING
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C      THIS TIME IS STORED IN ISTREC.THE TIME OF OCCURRENCE OF THE 1ST
C      SATELLITE DATA ITEM ON THIS RECORD IS STORED IN THE SATELLITE
C      DATA START TIME POSITIONS IN THE TITLE ARRAY.READING FROM THE
C      DISK RESUMES AND,UPON FINDING THE REQUESTED END TIME,THE NO. OF
C      THE RECORD IS STORED IN IENREC.THE TIME OF OCCURRENCE OF THE
C      LAST SATELLITE DATA ITEM ON THIS RECORD IS STORED IN THE
C      SATELLITE DATA END TIME POSITIONS IN THE TITLE ARRAY.THE DISK IS
C      REWOUND AND THE TITLE ARRAY(CORRESPONDS TO A REVISED TITLE
C      RECORD CONTAINING THE NEW START AND END TIMES OF THE SATELLITE
C      DATA) IS WRITTEN AS THE TITLE RECORD ON THE OUTPUT ORB3A TAPE.
C      DATA RECORDS ARE NOW READ FROM THE DISK AND COPIED ONTO THE
C      OUTPUT ORB3A TAPE FOR THOSE RECORDS ON THE DISK HAVING THE
C      NUMBERS BETWEEN ISTREC AND IENREC INCLUSIVE.FINALLY,SENTINEL
C      TYPE RECORDS ARE PREPARED AND THESE RECORDS ALONG WITH AN
C      END-OF-FILE ARE WRITTEN ON THE OUTPUT ORB3A TAPE.
C    REQUIRED SUBPROGRAMS
C      SUBROUTINE SUBPROGRAMS
C        RTAPE4,WSNECF,WTAPE4(ALL 3 ARE ENTRY POINTS TO RWTAP4).
C      FUNCTION SUBPROGRAMS
C        THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION,FLOAT
C    LANGUAGE AND SYSTEM
C      SELECT HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C      LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C    PROGRAMMER
C      ROBERT K.SCHLESSINGER
C      COMPUTER SCIENCES CORPORATION
C      SILVER SPRING,MARYLAND
C    PREPARED FOR
C      GODDARD SPACE FLIGHT CENTER
C      NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C      GREENBELT,MARYLAND
C    CONTRACT NUMBER AND COMPLETION DATE
C      NAS 5-11790,TASK 72,SUBTASK H
C      COMPLETED ON 7 MAY 1971
C
C *** START PROGRAM ***************************************************
C
ISN 0003        IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004        COMMON      TITLE(256),READIN(256)      ,PERIOD    ,ISAVE(6) ,
               1            ISET
ISN 0005        DATA        XNINES / 99999999.00 /
ISN 0006        DATA        INCRD     ,JSYOUT    ,IDISK / 5, 6, 14 /
C      TO FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GO TO* AND *CALL*
C      STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C      STATEMENT LABELS FROM 700-899 INCLUSIVE.
C
C      INPUT ORB3A TAPE IS ALREADY POSITIONED TO FIRST DATA RECORD FROM
C    MAIN PROGRAM.
C
C    COPY INPUT ORB3A DATA RECORDS(NOT TITLE RECORD) ON SCRATCH DISK
C      THROUGH FIRST SENTINEL RECORD.
ISN 0007      5 CALL RTAPE4(READIN,IERR)
ISN 0008        WRITE(IDISK) READIN
ISN 0009      700 IF(READIN(1).EQ.XNINES) GO TO 6
ISN 0011        702 GO TO 5
ISN 0012      6 CONTINUE
```

```
ISN 0013            REWIND IDISK
ISN 0014            ISTREC=0
ISN 0015            IENREC=0
ISN 0016            IRECRD=0
ISN 0017            IFILL=11
ISN 0018            IDATE=0
ISN 0019            LDATE=0
ISN 0020            IWORD=1
ISN 0021            NOEND=0
                C   READ REQUESTED PERIOD START AND END TIME.
ISN 0022            READ(INCRD,1000) IST,IHR,IEN,IEHR
                C   COMPUTE REQUESTED START AND END SECONDS.
ISN 0023            ST=FLOAT(IST)
ISN 0024            EN=FLOAT(IEN)
ISN 0025            JHR=IHR/100
ISN 0026            JMIN=IHR-(JHR*100)
ISN 0027            LHR=IEHR/100
ISN 0028            LMIN=IEHR-(LHR*100)
ISN 0029            ISEC=(JHR*3600)+(JMIN*60)
ISN 0030            SSEC=FLOAT(ISEC)
ISN 0031            ISEC=(LHR*3600)+(LMIN*60)
ISN 0032            ESEC=FLOAT(ISEC)
                C   PRINT REQUESTED TIME PERIOD SELECTED.
ISN 0033            WRITE(JSYOUT,2000) IST,SSEC,IEN,ESEC
ISN 0034         10 CONTINUE
                C   SEARCH FOR ACTUAL START TIME.
                C   READ A DATA RECORD FROM SCRATCH DISK.
ISN 0035            READ(IDISK) READIN
ISN 0036            IRECRD=IRECRD+1
                C   IF THIS RECORD IS A SENTINEL TYPE RECORD,PRINT ERROR MESSAGE
                C   STATING REQUESTED START TIME IS NOT ON INPUT ORB3A(GO TO 15).
ISN 0037        704 IF(READIN(1).EQ.XNINES) GO TO 15
                C   IF YRMODY OF 1ST DATA ITEM IN THIS RECORD EQUALS REQUESTED START
                C   YRMODY,GO TO 20.
ISN 0039        706 IF(READIN(2) .EQ. ST) GO TO 20
                C   IF REQUESTED START YRMODY HAS BEEN FOUND IN PREVICUS RECORD,
                C   BACKSPACE TO BEGINNING OF PREVICUS RECORD(GO TO 25).
ISN 0041        708 IF(IDATE.EQ.1) GO TO 25
ISN 0043        710 GO TO 10
ISN 0044         15 WRITE(JSYOUT,2010)
ISN 0045        720 GO TO 999
ISN 0046         20 CONTINUE
                C   SET IDATE=1 TO INDICATE REQUESTED START YRMODY HAS BEEN FOUND.
ISN 0047            IDATE=1
                C   IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE LESS THAN
                C   REQUESTED START SECONDS,READ ANOTHER RECORD(GO TO 10).
ISN 0048        722 IF(READIN(4) .LT. SSEC) GO TO 10
                C   IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE GREATER THAN
                C   REQUESTED START,CHECK IF THIS RECORD IS THE 1ST INPUT DATA
                C   RECORD(GO TO 24).
ISN 0050        724 IF(READIN(4) .GT. SSEC) GO TO 24
                C   IF HERE,READIN(4) = SSEC.
                C   STORE VALUE OF RECORD COUNTER TO BE USED AS 1ST RECORD TO BE
                C   WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0052            ISTREC=IRECRD
                C   END SEARCH FOR ACTUAL START TIME.
```

```
C     STORE ACTUAL START TIME IN TITLE ARRAY.
ISN 0053      TITLE(4)=READIN(2)
ISN 0054      TITLE(5)=READIN(3)
ISN 0055      TITLE(6)=READIN(4)
ISN 0056    730 GO TO 30
C     IF THIS RECORD IS THE 1ST INPUT DATA RECORD,PRINT ERROR MESSAGE
C     STATING REQUESTED START TIME IS NOT ON INPUT ORB3A(GO TO 15).
ISN 0057     24 IF(IRECRD.EQ.1) GO TO 15
ISN 0058     25 CONTINUE
C     BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0060      BACKSPACE IDISK
ISN 0061      BACKSPACE IDISK
C     STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS 1ST RECORD TO
C     BE WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0062      ISTREC=IRECRD-1
C     NOW RE-READ PREVIOUS RECORD TO OBTAIN ACTUAL START TIME.
ISN 0063      READ(IDISK) READIN
C     END SEARCH FOR ACTUAL START TIME.
C     STORE ACTUAL START TIME IN TITLE ARRAY.
ISN 0064      TITLE(4)=READIN(2)
ISN 0065      TITLE(5)=READIN(3)
ISN 0066      TITLE(6)=READIN(4)
C     READ 1 RECORD TO PROPERLY POSITION DISK TO BEGINNING OF RECORD
C     WHICH HAS NOT YET BEEN READ FROM DISK.
ISN 0067      READ(IDISK) READIN
ISN 0068     30 CONTINUE
C     SEARCH FOR ACTUAL END TIME.
C     READ A DATA RECORD FROM SCRATCH DISK.
ISN 0069      READ(IDISK) READIN
ISN 0070      IRECRD=IRECRD+1
C     IF THIS RECORD IS A SENTINEL TYPE RECORD,BACKSPACE TO BEGINNING
C     OF PREVIOUS RECORD(GO TO 35).
ISN 0071    732 IF(READIN(1).EQ.XNINES) GO TO 35
C     IF YRMODY OF 1ST DATA ITEM IN THIS RECORD EQUALS REQUESTED END
C     YRMODY,GO TO 49.
ISN 0073    734 IF(READIN(2) .EQ. EN) GO TO 49
ISN 0075    740 GO TO 48
C     IF HERE,READIN(1)=XNINES
C     BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0076     35 BACKSPACE IDISK
ISN 0077      BACKSPACE IDISK
C     STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS LAST RECORD TO
C     BE WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0078      IENREC=IRECRD-1
C     END SEARCH FOR ACTUAL END TIME.
C     NOW,RE-READ PREVIOUS RECORD.SINCE THIS PREVIOUS RECORD IS THE LAST
C     RECORD ON THE TAPE,THE END TIME OF SATELLITE DATA IN TITLE RECORD
C     WILL NOT HAVE TO BE CHANGED.
ISN 0079      READ(IDISK) READIN
C     CHECK TO SEE IF THIS FINAL DATA RECORD HAS 11 VALID DATA ITEMS.
ISN 0080      DO 43 I=1,211,21
ISN 0081    742 IF(READIN(I) .EQ. XNINES) GO TO 44
ISN 0083     43 CONTINUE
C     IF HERE,THIS RECORD HAS ELEVEN VALID DATA ITEMS.
C     IF YRMODY OF LAST DATA ITEM IN THIS FINAL DATA RECORD IS NOT EQUAL
C     TO REQUESTED END YRMODY,GO TO 42.
```

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ISN 0084        744 IF(READIN(212) .NE. EN) GO TO 42
                C     IF SEC OF DAY OF LAST DATA ITEM IN THIS FINAL DATA RECORD ARE
                C     GREATER THAN OR EQUAL TO REQUESTED END SECONDS,REWIND DISK AND
                C     PREPARE TO GENERATE OUTPUT ORB3A(GO TO 60).
ISN 0086        746 IF(READIN(214) .GE. ESEC) GO TO 60
ISN 0088         45 CONTINUE
                C     IF HERE,REQUESTED END TIME IS GREATER THAN LAST TIME ON INPUT
                C     ORB3A TAPE BUT OUTPUT ORB3A WILL BE GENERATED ANYWAY.
ISN 0089              WRITE(JSYOUT,2020)
ISN 0090              NOEND=1
                C     REWIND DISK AND PREPARE TO GENERATE OUTPUT ORB3A.
ISN 0091        750 GO TO 60
                C     IF REQUESTED END YRMODY HAS BEEN FOUND IN PREVIOUS RECORD,REWIND
                C     DISK AND PREPARE TO GENERATE OUTPUT ORB3A(GO TO 60).
ISN 0092         42 IF(LDATE.EQ.1) GO TO 60
ISN 0094        760 GO TO 45
ISN 0095         44 CONTINUE
                C     IF HERE,THIS RECORD DOES NOT HAVE ELEVEN VALID DATA ITEMS.
ISN 0096              IFILL=0
                C     FIND LOCATION OF YRMODY OF LAST VALID DATA ITEM.
ISN 0097              LYRMDY=I-21+1
                C     FIND LOCATION OF SECONDS OF DAY OF LAST VALID DATA ITEM.
ISN 0098              LSOD=I-21+3
                C     IF YRMODY OF LAST VALID DATA ITEM IN THIS FINAL DATA RECORD IS NOT
                C     EQUAL TO REQUESTED END YRMODY,GO TO 42
ISN 0099        762 IF(READIN(LYRMDY) .NE. EN) GO TO 42
                C     IF HERE,YRMODY OF LAST VALID DATA ITEM = REQUESTED END YRMODY.
                C     IF SEC OF DAY OF LAST VALID DATA ITEM IN THIS FINAL DATA RECORD
                C     ARE GREATER THAN OR EQUAL TO REQUESTED END SECONDS,REWIND DISK AND
                C     PREPARE TO GENERATE OUTPUT ORB3A(GO TO 60).
ISN 0101        764 IF(READIN(LSOD) .GE. ESEC) GO TO 60
                C     IF HERE,SECONDS OF DAY OF LAST VALID DATA ITEM .LT. REQUESTED
                C     END SECONDS.
ISN 0103        770 GO TO 45
ISN 0104         48 CONTINUE
                C     IF REQUESTED END YRMODY HAS BEEN FOUND IN PREVIOUS RECORD.
                C     BACKSPACE TO BEGINNING OF PREVIOUS RECORD(GO TO 51).
ISN 0105        772 IF(LDATE .EQ. 1) GO TO 51
                C     IF HERE, LDATE .NE. 1 .THIS MEANS THE REQUESTED END YRMODY HAS NOT
                C     YET BEEN FOUND.
                C     THEREFORE,READ ANOTHER RECORD FROM SCRATCH DISK.
ISN 0107        780 GO TO 30
ISN 0108         51 CONTINUE
                C     BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0109              BACKSPACE IDISK
ISN 0110              BACKSPACE IDISK
                C     NOW RE-READ PREVIOUS RECORD.
ISN 0111              READ(IDISK) READIN
                C     IF YRMODY OF LAST DATA ITEM IN THIS RECORD IS NOT EQUAL TO
                C     REQUESTED END YRMODY,THIS PREVIOUS RECORD CONTAINS ACTUAL
                C     END TIME(GO TO 52).
ISN 0112        782 IF(READIN(212) .NE. EN) GO TO 52
                C     IF SEC OF DAY OF LAST DATA ITEM IN THIS RECORD ARE GREATER THAN OR
                C     EQUAL TO REQUESTED END SECONDS,THIS PREVIOUS RECORD CONTAINS
                C     ACTUAL END TIME(GO TO 52).
ISN 011A        784 IF(READIN(214) .GE. ESEC) GO TO 52
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                C     IF HERE,NEXT RECORD AFTER THIS PREVIOUS RECORD IS THE END RECORD.
ISN 0116          790 GO TO 54
ISN 0117          49 CONTINUE
                C     SET LDATE=1 TO INDICATE REQUESTED END YRMODY HAS BEEN FOUND.
ISN 0118          LDATE=1
                C     IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE LESS THAN
                C     REQUESTED END SECONDS,READ ANETHER RECORD(GO TO 30).
ISN 0119          792 IF(READIN(4) .LT. ESEC) GO TO 30
                C     IF HERE,READIN(4) .GE. REQUESTED END SECONDS OF DAY.
                C     IF SEC OF DAY OF 1ST DATA ITEM IN THIS RECORD ARE EQUAL TO
                C     REQUESTED END SECONDS,THIS RECORD CONTAINS ACTUAL END
                C     TIME(GO TO 53).
ISN 0121          794 IF(READIN(4) .EQ. ESEC) GO TO 53
                C     IF HERE,READIN(4) .GT. REQUESTED END SECONDS OF DAY.
                C     BACKSPACE TO BEGINNING OF PREVIOUS RECORD.
ISN 0123          BACKSPACE IDISK
ISN 0124          BACKSPACE IDISK
                C     NOW,RE-READ PREVIOUS RECORD.
ISN 0125          READ(IDISK) READIN
                C     IF SEC OF DAY OF LAST DATA ITEM IN THIS RECORD ARE LESS THAN
                C     REQUESTED END SECONDS,NEXT RECORD CONTAINS ACTUAL END
                C     TIME(GO TO 54).
ISN 0126          796 IF(READIN(214) .LT. ESEC) GO TO 54
ISN 0128          52 CONTINUE
                C     IF HERE,THIS PREVIOUS RECORD CONTAINS ACTUAL END TIME.
                C     STORE VALUE OF RECORD COUNTER MINUS 1 TO BE USED AS LAST RECORD TO
                C     BE WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0129          IENREC=IRECRD-1
ISN 0130          800 GO TO 55
ISN 0131          53 CONTINUE
                C     IF HERE,PRESENT RECORD CONTAINS ACTUAL END TIME.
                C     STORE VALUE OF RECORD COUNTER TO BE USED AS LAST RECORD TO BE
                C     WRITTEN(COPIED) ON OUTPUT ORB3A.
ISN 0132          IENREC=IRECRD
ISN 0133          55 CONTINUE
                C     END SEARCH FOR ACTUAL END TIME.
                C     STORE ACTUAL END TIME IN TITLE ARRAY.
ISN 0134          TITLE(7)=READIN(212)
ISN 0135          TITLE(8)=READIN(213)
ISN 0136          TITLE(9)=READIN(214)
                C     REWIND DISK AND PREPARE TO GENERATE OUTPUT ORB3A.
ISN 0137          810 GO TO 60
ISN 0138          54 CONTINUE
                C     READ 1 RECORD TO OBTAIN ACTUAL END TIME.
ISN 0139          READ(IDISK) READIN
ISN 0140          820 GO TO 53
ISN 0141          60 CONTINUE
                C     REWIND DISK AND PREPARE TO GENERATE OUTPUT ORB3A.
ISN 0142          REWIND IDISK
                C     WRITE TITLE RECORD ON OUTPUT ORB3A.
ISN 0143          830 CALL WTAPE4(TITLE)
                C     SET SCRATCH DISK RECORD COUNTER TO ZERO.
ISN 0144          IRECRD=0
ISN 0145          832 IF(ISTREC .NE. 1) GO TO 80
                C     IF HERE,COPYING PROCEDURE FROM SCRATCH DISK TO OUTPUT ORB3A BEGINS
                C     WITH RECORD 1 ON SCRATCH DISK.
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ISN 0147        70 CONTINUE
                C     READ A RECORD FROM SCRATCH DISK.
ISN 0148              READ(IDISK) READIN
                C     INCREMENT RECORD READ FROM SCRATCH DISK BY ONE.
ISN 0149              IRECRD=IRECRD+1
                C     WRITE(COPY) THIS RECORD ON OUTPUT ORB3A.
ISN 0150        840 CALL WTAPE4(READIN)
ISN 0151        842 IF(IRECRD .EQ. IENREC) GO TO 100
                C     IF HERE,THERE ARE MORE RECORDS TO BE COPIED.
ISN 0153        850 GO TO 70
ISN 0154        60 CONTINUE
                C     READ A RECORD FROM SCRATCH DISK WITHOUT COPYING TO OUPUT ORB3A.
                C     THIS IS TO EVENTUALLY POSITION SCRATCH DISK SO THAT COPYING CAN
                C     BEGIN LATER.
ISN 0155              READ(IDISK) READIN
                C     INCREMENT RECORD READ FROM SCRATCH DISK BY ONE.
ISN 0156              IRECRD=IRECRD+1
ISN 0157        852 IF(IRECRD+1 .EQ. ISTREC) GO TO 70
                C     IF HERE,THERE ARE MORE SCRATCH DISK RECORDS TO BE READ WITHOUT
                C     COPYING TO OUTPUT ORB3A.
ISN 0159        860 GO TO 80
ISN 0160        100 CONTINUE
                C     PREPARE TO WRITE END SENTINELS ON OUTPUT ORB3A.
                C
                C     CREATE A RECORD HAVING 99999999.DO IN THE FIRST WORD ONLY.
ISN 0161              TITLE(1)=XNINES
ISN 0162        862 IF(IFILL .EQ. 11) GO TO 105
                C     IF HERE,LAST DATA RECORD WRITTEN ON ORB3A DOES NOT HAVE ELEVEN
                C     VALID DATA ITEMS.
ISN 0164              IWORD=2
                C     IWORD=2 WILL CAUSE WSNEOF TO WRITE 2 SENTINEL RECORDS ON
                C     OUTPUT ORB3A.
ISN 0165        870 GO TO 110
ISN 0166        105 CONTINUE
                C     IF HERE,LAST DATA RECORD WRITTEN ON ORB3A HAS ELEVEN VALID DATA
                C     ITEMS.
                C
                C     CREATE A RECORD HAVING 99999999.DO IN EACH OF THE FIRST 21 WORDS.
ISN 0167              DO 108 L=1,21
ISN 0168              READIN(L)=XNINES
ISN 0169        108 CONTINUE
ISN 0170        110 CONTINUE
                C     NOW WRITE END SENTINELS ON OUTPUT ORB3A.
ISN 0171        880 CALL WSNEOF(READIN,TITLE,IWORD)
ISN 0172              IF(NDEND.EQ.0)WRITE(JSYOUT,2030)
                C     WRITE ACTUAL START AND END TIME OF PERIOD OF DATA WRITTEN ON
                C     OUTPUT ORB3A.
ISN 0174              WRITE(JSYOUT,2040) TITLE(4),TITLE(6),TITLE(7),TITLE(9)
ISN 0175              WRITE(JSYOUT,2050)
ISN 0176       1000 FORMAT(I6,1X,I4,1X,I6,1X,I4)
ISN 0177       2000 FORMAT(1H0,59X, 10HSTART TIME,9X,8HEND TIME/
                   1       1H ,20X, 30HREQUESTED TIME PERIOD SELECTED,6X,4HDATE,2X,
                   2       10HSEC OF DAY,2X,4HDATE,2X,10HSEC OF DAY/
                   3       1H ,20X, 22HFOR OUTPUT ORB3A TAPE=,13X,I6,1X,F7.0,4X,
                   4       I6,1X,F7.0)
ISN 0178       2010 FORMAT(1H0,20X, 69HREQUESTED START TIME IS NOT ON INPUT ORB3A TAPE
```

```
     1,EXECUTION TERMINATED.)
ISN 0179      2020 FORMAT(1HO,20X, 64HREQUESTED END TIME IS GREATER THAN LAST TIME ON
     1 INPUT ORB3A TAPE/
     2         1H ,20X, 47HBUT OUTPUT ORB3A TAPE WILL BE GENERATED ANYWAY.
     3)
ISN 0180      2030 FORMAT(1HO,20X, 65HENTIRE REQUESTED TIME PERIOD SELECTED EXISTS ON
     1 INPUT ORB3A TAPE./
     2         1H ,20X, 37HOUTPUT ORB3A TAPE HAS BEEN GENERATED.)
ISN 0181      2040 FORMAT(1HO,59X, 10HSTART TIME,9X,8HEND TIME/
     1         1H ,20X, 27HACTUAL TIME PERIOD SELECTED,9X,4HDATE,2X,
     2       10HSEC OF DAY,2X,4HDATE,2X,10HSEC OF DAY/
     3         1H ,20X, 22HFOR OUTPUT ORB3A TAPE.,12X,F8.0,F7.0,3X,
     4       F8.0,F7.0)
ISN 0182      2050 FORMAT(1HO,20X, 48HNORMAL TERMINATION OF SELECT TIME PERIOD OPTION
     1.)
ISN 0183       999 RETURN
ISN 0184          END
```

```
SYMBOL  INTERNAL STATEMENT NUMBERS
I       0080  0081  CC97  CC98
L       0167  0168
EN      0024  0073  CC84  CC99  0112
ST      0023  0039
IEN     0022  0024  0033
IHR     0022  0025  0026
IST     0022  0023  0033
JHR     0025  0026  0029
LHR     0027  0028  0031
ESEC    0032  0033  0086  0101  0114  0119  0121  0126
IEHR    0022  0027  0028
IERR    0007
ISEC    0029  0030  0031  0032
ISET    0004
JMIN    0026  0029
LMIN    0028  0031
LSOD    0098  0101
SSEC    0030  0033  0048  0050
FLOAT   0023  0024  0030  0032
IDATE   0018  0041  0047
IDISK   0006  0008  0013  0035  0060  0061  0063  0067  0069  0076  0077  0079  0109  0110  0111  0123  0124  0125  0139
        0142  0146  0155
IFILL   0017  0096  0162
INCRD   0006  0022
ISAVE   0004
IWORD   0020  0164  0171
LDATE   0019  0092  0105  0118
NDEND   0021  0090  0172
TITLE   0004  0053  0054  0055  0064  0065  0066  0134  0135  0136  0143  0161  0171  0174  0174  0174  0174
IENREC  0015  0076  0129  0132  0151
IRECRD  0016  0036  0036  0052  0057  0062  0070  0070  0078  0129  0132  0144  0149  0149  0151  0156  0156  0157
ISTREC  0014  0062  0062  0145  0157
JSYOUT  0006  0033  0044  0089  0172  0174  0175
LYRMDY  0097  0099
PERIOD  0004
READIN  0004  0007  0008  0009  0035  0037  0039  0048  0060  0053  0054  0055  0063  0064  0065  0066  0067  0069  0071
        0073  0079  0081  0084  0086  0099  0101  0111  0112  0114  0119  0121  0125  0126  0134  0135  0136  0139  0148
        0150  0156  0168  0171
RTAPE4  0007
SELECT  0002
WSNEOF  0171
WTAPE4  0143  0150
XNINES  0005  0009  0037  0071  0081  0161  0168
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
5	0007	C011
6	0012	0009
10	0034	0043 0048
15	0044	0037 0057
20	0046	0039
24	0057	0050
25	0059	0041
30	0068	0056 0107 0110
35	0076	C071
42	0092	0084 0099
43	0083	0080
44	0095	0081
45	0088	0094 0103
48	0104	0075
49	0117	0073
51	0108	0105
52	0128	0112 0114
53	0131	0121 0140
54	0138	0116 0126
55	0133	0150
60	0141	0086 0091 0092 0101 0137
70	0147	0153 0157
80	0154	0145 0159
100	0160	0151
105	0166	0162
108	0169	0167
110	0170	0165
700	0009	
702	0011	
704	0037	
706	0039	
708	0041	
710	0043	
720	0045	
722	0048	
724	0050	
730	0056	
732	0071	
734	0073	
740	0075	
742	0081	
744	0084	
746	0086	
750	0091	
760	0094	
762	0095	
764	0101	
770	0103	
772	0105	
780	0107	
782	0112	
784	0114	
790	0116	
792	0119	

*****F C-R-T-R-A-N G-R-O-S-S R-E-F-E-R-E-N-C-E L-I-S-T-I-N-G*****

LABEL	DEFINED	REFERENCES
794	0121	
796	0126	
800	0130	
810	0137	
820	0140	
830	0143	
832	0145	
840	0150	
842	0151	
850	0153	
852	0157	
860	0159	
862	0162	
870	0165	
880	0171	
990	0183	0085
1000	0176	0022
2000	0177	0033
2010	0178	0044
2020	0179	0069
2030	0180	0172
2040	0181	0174
2050	0182	0175

/ SELECT / SIZE OF PROGRAM 000D62 HEXADECIMAL BYTES PAGE 013

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	SF	I*4	0003BC	L	SF	I*4	0003C0	EN	S	R*8	000420	ST	S	R*8	000428
IEN	SFA	I*4	0003C4	IHR	SF	I*4	0003C8	IST	SFA	I*4	0003CC	JHR	SF	I*4	0003D0
LHR	SF	I*4	0003D4	ESEC	SF	R*8	000430	IEHR	SF	I*4	0003D8	IERR	SFA	I*4	0003DC
ISEC	SFA	I*4	0003E0	ISET	C	I*4	N.R.	JMIN	SF	I*4	0003E4	LMIN	SF	I*4	0003E8
LSCD	S	I*4	0003EC	SSEC	SF	R*8	000438	IDATE	S	I*4	0003F0	IDISK	F	I*4	0003F4
IFILL	S	I*4	0003F8	INCRD	F	I*4	0003FC	ISAVE	C	I*4	N.R.	IWORD	SFA	I*4	000400
LDATE	S	I*4	000404	NOEND	S	I*4	000408	TITLE	SFA C	R*8	000000	IBCOM=	F XF	I*4	000000
IENREC	S	I*4	00040C	IRECRD	SF	I*4	000410	ISTREC	S	I*4	000414	JSYOUT	F	I*4	000418
LYRMDY	S	I*4	00041C	PERIOD	C	R*8	N.R.	READIN	SFA C	R*8	000800	RTAPE4	SF XF	R*8	000000
SELECT		R*8	000440	WSNEOF	SF XF	R*8	000000	WTAPE4	SF XF	R*8	000000	XNINES	F	R*8	000448

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
TITLE	R*8	000000	READIN	R*8	000800	PERIOD	R*8	N.R.	ISAVE	I*4	N.R.
ISET	I*4	N.R.									

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   LABEL    ADDR        LABEL    ADDR        LABEL    ADDR        LABEL    ADDR

       5    000548      700    000578 NR     702    000588        6    000590
      10    000784      704    0007AC NR     706    0007BE      708    0007D0
     710    0007DE       15    0007E4        720    0007F8 NR     20    0007FE
     722    0008C6 NR    724    000818        730    00084E NR     24    000854
      25    000862       30    0008DC        732    000904 NR    734    000916
     740    000928       35    00092E        742    000978       43    000992
     744    0009A8      746    0009BA         45    0009CC       750    0009E8 NR
      42    0009EE       760    0009FC        44    000A02       762    000A2A NR
     764    000A44      770    000A5E         48    000A64       772    000A64 NR
     780    000A72       51    000A78        782    000AAC NR    784    000ABE
     790    000AD0       49    000AD6        792    000ADE NR    794    000AF0
     796    000B38 NR    52    000B4A        800    000B56 NR     53    000B5C
      55    000B64      810    000B80 NR      54    000B86      820    000BA4 NR
      60    000BAA       830    000BB8 NR     832    000BCE NR     70    000BDC
     840    000C04 NR    842    000C12 NR     850    000C20       80    000C26
     852    000C50 NR    860    000C62        100    000C68      862    000C74 NR
     870    000C8A NR    105    000C90        108    000CAC      110    000CC2
     880    000CC2 NR    999    000D3C

 *OPTIONS IN EFFECT*      NAME=   MAIN,OPT=00,LINECNT=58,SIZE=0000K,

 *OPTIONS IN EFFECT*      SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

 *STATISTICS*     SOURCE STATEMENTS =      183 ,PROGRAM SIZE =      3426

 *STATISTICS*  NO  DIAGNOSTICS GENERATED

 ****** END OF COMPILATION ******                          97K BYTES OF CORE NOT USED
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LEVEL 19 (- JUNE 70 )          OS/360 FORTRAN H                    DATE 71.168/11.43.58

          COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
 ISN 0002                 SUBROUTINE SUNLGT
                  C     PURPOSE
                  C       SUBROUTINE SUNLGT ISOLATES WHICH SATELLITE DATA ITEMS ON AN
                  C       INPUT ORB3A TAPE ARE OF THE SUNLIGHT ENTRANCE/EXIT TYPE AND
                  C       PRINTS OUT A BCD SUNLIGHT REPORT CONTAINING THE PASS NUMBERS AND
                  C       TIMES OF OCCURRENCE OF THESE SUNLIGHT ENTRANCE/EXIT DATA ITEMS.
                  C     CALLING SEQUENCE
                  C       CALL SUNLGT
                  C       THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
                  C     INPUT(THROUGH COMMON)
                  C       NONE.
                  C     OUTPUT(THROUGH COMMON)
                  C       NONE.
                  C     MAJOR VARIABLES
                  C       INHR          = SUNLIGHT ENTRANCE HOUR OF DAY
                  C       INMIN         = SUNLIGHT ENTRANCE MINUTE OF HOUR
                  C       INORB         = SUNLIGHT ENTRANCE PASS NO.
                  C       INSEC         = SUNLIGHT ENTRANCE SECOND OF MINUTE
                  C       INT           = SUNLIGHT ENTRANCE YEAR-MONTH-DAY
                  C       INT1          = SUNLIGHT ENTRANCE DAY OF YEAR
                  C       IOHR          = SUNLIGHT EXIT HOUR OF DAY
                  C       IOMIN         = SUNLIGHT EXIT MINUTE OF HOUR
                  C       IORB          = SUNLIGHT EXIT PASS NO.
                  C       IOSEC         = SUNLIGHT EXIT SECOND OF MINUTE
                  C       IOUT          = SUNLIGHT EXIT YEAR-MONTH-DAY
                  C       IOUT1         = SUNLIGHT EXIT DAY OF YEAR
                  C       JSYOUT        = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).
                  C       READIN(1)     = USED TO CHECK FOR PRESENCE OF SENTINEL ITEM
                  C                       RECORD OR SENTINEL RECORD.
                  C       READIN(I-20) = DATA ITEM TYPE INDICATOR OF KTH OF ELEVEN
                  C                       SATELLITE DATA ITEMS IN ORB3A RECORD.
                  C                       =1,REGULAR SATELLITE DATA ITEM.
                  C                       =2,ASCENDING NODE CROSSING DATA ITEM.
                  C                       =3,NORTH POINT DATA ITEM.
                  C                       =4,DESCENDING NODE DATA ITEM.
                  C                       =5,SOUTH POINT DATA ITEM.
                  C                       =6,SUNLIGHT ENTRANCE DATA ITEM.
                  C                       =7,SUNLIGHT EXIT DATA ITEM.
                  C       READIN(I-17) = SECONDS OF DAY OF SUNLIGHT ENTRANCE OR EXIT
                  C     REFERENCE
                  C       IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,''ORBITAL
                  C       DETERMINATION UTILITY PROGRAMS,''CONTRACT NAS 5-10022,MARCH 1970
                  C       (TELOR3 PROGRAM SECTION)
                  C     METHOD
                  C       SUBROUTINE SUNLGT DETERMINES IF AN ORB3A DATA RECORD CONTAINS A
                  C       SUNLIGHT ENTRANCE OR EXIT DATA ITEM BY EXAMINING THE TYPE
                  C       INDICATOR(FIRST WORD) OF EACH OF THE ELEVEN SATELLITE DATA ITEMS
                  C       IN THE RECORD(READIN(I-20),I=21,231,21).WHEN THE FIRST WORD OF A
                  C       DATA ITEM CONTAINS A TYPE INDICATOR EQUAL TO 6(OR 7),AN
                  C       ENTRANCE(OR EXIT) ITEM HAS BEEN FOUND.THE PASS NO.,YEAR-MONTH-
                  C       DAY,DAY-OF-YEAR,AND TIME(SUNLGT CONVERTS TO HRS,MIN,SEC) OF THE
                  C       ENTRANCE AND/OR EXIT ARE PRINTED AS THE BCD OUTPUT OF THE
                  C       SUNLIGHT REPORT.
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                C     REQUIRED SUBPROGRAMS
                C       SUBROUTINE SUBPROGRAMS
                C         RTAPE4(ENTRY POINT TO RWTAP4).
                C       FUNCTION SUBPROGRAMS
                C         THE FORTRAN BASIC SUPPLIED MATHEMATICAL FUNCTION,FLOAT
                C     LANGUAGE AND SYSTEM
                C       SUNLGT HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
                C       LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
                C     PROGRAMMER
                C       ROBERT K.SCHLESSINGER
                C       COMPUTER SCIENCES CORPORATION
                C       SILVER SPRING,MARYLAND
                C     PREPARED FOR
                C       GODDARD SPACE FLIGHT CENTER
                C       NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
                C       GREENBELT,MARYLAND
                C     CONTRACT NUMBER AND COMPLETION DATE
                C       NAS 5-11790,TASK 72,SUBTASK H
                C       COMPLETED ON 7 MAY 1971
                C
                C *** START PROGRAM ***************************************************
                C
ISN 0003                IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004                DIMENSION       READIN(256)
ISN 0005                DATA            XNINES / 99999999.D0 /
ISN 0006                DATA            JSYOUT / 6 /
                C     TO FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GO TO* AND *CALL*
                C     STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
                C     STATEMENT LABELS FROM 700-899 INCLUSIVE.
                C     THE *RETURN* STATEMENT(NOT REFERENCED INITIALLY) HAS BEEN ASSIGNED
                C     THE LABEL 999 .
                C
                C     INDICATES WHETHER OR NOT LATEST ENTRANCE FOUND HAS BEEN PRINTED.
ISN 0007                IGO=0
                C     INDICATES WHETHER OR NOT ANY ENTRANCES HAVE BEEN FOUND.
ISN 0008                IFST=0
                C     INDICATES WHETHER OR NOT ANY EXITS HAVE BEEN FOUND.
ISN 0009                IEXIT=0
                C     SET UP HEADINGS FOR SUNLIGHT REPORT.
ISN 0010              8 WRITE(JSYOUT,2000)
ISN 0011                ICOUNT=3
ISN 0012                WRITE(JSYOUT,2010)
                C     READ AN INPUT ORB3A DATA RECORD OR SENTINEL TYPE RECORD.
ISN 0013             10 CALL RTAPE4(READIN,IERR)
                C     IF THIS RECORD IS A SENTINEL TYPE,EXIT READ LOOP(GO TO 600).
ISN 0014            700 IF(READIN(1).EQ.XNINES) GO TO 600
                C     SEE IF DATA RECORD CONTAINS ANY ENTRANCE OR EXIT ITEMS.
ISN 0016                DO 100 I=21,231,21
                C     IF TYPE INDICATOR OF KTH OF 11 DATA ITEMS IN READIN EQUALS 6.(OR
                C     7.), AN ENTRANCE(OR EXIT) HAS BEEN FOUND.PROCESS DATA PERTAINING
                C     TO ENTRANCE(OR EXIT) ITEM,GO TO 200(OR 300).
ISN 0017            702 IF(READIN(I-20).EQ. 6.D0) GO TO 200
ISN 0019            704 IF(READIN(I-20).EQ. 7.D0) GO TO 300
ISN 0021            100 CONTINUE
                C     NO ENTRANCE/EXIT ITEM FOUND IN RECORD.READ NEXT INPUT RECORD.
ISN 0022            706 GO TO 10
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                C     IF HERE,AN ENTRANCE HAS BEEN FOUND.
                C     SET IFST=1 TO INDICATE AT LEAST 1 ENTRANCE HAS BEEN FOUND ON TAPE.
ISN 0023          200 IFST=1
                C     INDICATES LATEST ENTRANCE FOUND HAS NOT BEEN PRINTED YET.
ISN 0024          IGO=1
                C     *** STORE ENTRANCE YEAR-MONTH-DAY.
ISN 0025          INT=READIN(I-19)
                C     *** STORE ENTRANCE DAY OF YEAR.
ISN 0026          INT1=READIN(I-18)
                C     CONVERT ENTRANCE TIME(SEC OF DAY) TO HR OF DAY(INCLUDES ANY
                C     FRACTION).
ISN 0027          DIFF=READIN(I-17)/3600.
                C     *** TRUNCATE ENTRANCE TIME TO HR OF DAY(DROPS FRACTION).
ISN 0028          INHR=DIFF
                C     CONVERT ENTRANCE HR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0029          DIFF1=FLOAT(INHR)
                C     COMPUTE ENTRANCE MINUTE OF HOUR(INCLUDES ANY FRACTION).
ISN 0030          DIFF2=(DIFF-DIFF1)*60.
                C     *** TRUNCATE ENTRANCE TIME TO MINUTE OF HR(DROPS FRACTION).
ISN 0031          INMIN=DIFF2
                C     CONVERT ENTRANCE MINUTE OF HR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0032          DIFF1=FLOAT(INMIN)
                C     COMPUTE ENTRANCE SECOND OF MINUTE(INCLUDES ANY FRACTION).
ISN 0033          DIFF2=(DIFF2-DIFF1)*60.
                C     *** TRUNCATE ENTRANCE TIME TO SEC OF MINUTE(DROPS FRACTION).
ISN 0034          INSEC=DIFF2
                C     *** STORE ENTRANCE PASS NO.
ISN 0035          INORB=READIN(I)
                C     DO NOT PRINT ENTRANCE DATA YET,READ NEXT INPUT RECORD(LOOK
                C     FOR AN EXIT ITEM).
ISN 0036          710 GO TO 10
                C     IF HERE,AN EXIT HAS BEEN FOUND.
                C     SET EXIT=1 TO INDICATE AT LEAST 1 EXIT HAS BEEN FOUND ON TAPE.
ISN 0037          300 IEXIT=1
                C     *** STORE EXIT YEAR-MONTH-DAY.
ISN 0038          IOUT=READIN(I-19)
                C     *** STORE EXIT DAY OF YEAR.
ISN 0039          IOUT1=READIN(I-18)
                C     CONVERT EXIT TIME(SEC OF DAY) TO HR OF DAY(INCLUDES ANY FRACTION).
ISN 0040          DIFF=READIN(I-17)/3600.
                C     *** TRUNCATE EXIT TIME TO HR OF DAY(DROPS FRACTION).
ISN 0041          IOHR=DIFF
                C     CONVERT EXIT HR OF DAY TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0042          DIFF1=FLOAT(IOHR)
                C     COMPUTE EXIT MINUTE OF HOUR(INCLUDES ANY FRACTION).
ISN 0043          DIFF=(DIFF-DIFF1)*60.
                C     *** TRUNCATE EXIT TIME TO MINUTE OF HR(DROPS FRACTION).
ISN 0044          IOMIN=DIFF
                C     CONVERT EXIT MINUTE OF HR TO REAL FORMAT WITHOUT ROUND OFF.
ISN 0045          DIFF1=FLOAT(IOMIN)
                C     COMPUTE EXIT SECOND OF MINUTE(INCLUDES ANY FRACTION).
ISN 0046          DIFF=(DIFF-DIFF1)*60.
                C     *** TRUNCATE EXIT TIME TO SEC OF MINUTE(DROPS FRACTION).
ISN 0047          IOSEC=DIFF
                C     *** STORE EXIT PASS NO.
ISN 0048          IORB=READIN(I)
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ISN 0049            ICOUNT=ICOUNT+1
                C     IF 1ST ENTRANCE/EXIT FOUND ON TAPE IS AN EXIT,PRINT THIS EXIT DATA
                C     WITH PRINT EXIT ONLY STATEMENT(GO TO 400).
ISN 0050          712 IF (IFST.EQ.0) GO TO 400
                C     IF HERE,PRINT ENTRANCE DATA(WHICH HAS BEEN STORED) ALONG WITH
                C     PRESENT EXIT DATA.
ISN 0052            WRITE(JSYOUT,2030) INORB,INT,INT1,INHR,INMIN,INSEC,IGORB,IOUT,
                   1                   IOUT1,IOHR,IOMIN,IOSEC
                C     SET IGO=0 TO INDICATE LATEST ENTRANCE FOUND HAS BEEN PRINTED.
ISN 0053            IGO=0
                C     TEST LINE COUNTER TO SEE IF SUNLIGHT REPORT PAGE IS FILLED.
ISN 0054          720 GO TO 502
                C     IF HERE,1ST ENTRANCE/EXIT FOUND ON TAPE IS AN EXIT,PRINT THIS EXIT
                C     DATA NOW.
ISN 0055          400 WRITE(JSYOUT,2020) IGORB,IOUT,IOUT1,IOHR,IOMIN,IOSEC
                C     IF SUNLIGHT REPORT PAGE IS FILLED,PRINT COLUMN HEADINGS
                C     ON NEW PAGE(GO TO 8).
ISN 0056          502 IF (ICOUNT.GT.49) GO TO 8
                C     READ NEXT INPUT RECORD.
ISN 0058          730 GO TO 10
                C     IF HERE,A SENTINEL TYPE RECORD HAS BEEN ENCOUNTERED.
                C     IF LATEST ENTRANCE FOUND HAS NOT BEEN PRINTED YET,PRINT ENTRANCE
                C     DATA NOW.
ISN 0059          600 IF(IGO.EQ.1) WRITE(JSYOUT,2040) INORB,INT,INT1,INHR,INMIN,INSEC
ISN 0061            WRITE(JSYOUT,2050)
                C     IF NO ENTRANCES AND NO EXITS HAVE BEEN FOUND ON INPUT TAPE,PRINT
                C     APPROPRIATE SIGN OFF MESSAGE.
ISN 0062            IF(IFST.EQ.0 .AND. IEXIT.EQ.0) WRITE(JSYOUT,2060)
ISN 0064        2000 FORMAT(1H1,24X,17HSUNLIGHT ENTRANCE,30X,13HSUNLIGHT EXIT)
ISN 0065        2010 FORMAT(1H ,10X,8HPASS NO.,4X,6H DATE ,5X,9HDAY OF YR,6X,2HHR,1X,
                   1        3HMIN,1X,3HSEC,6X,8HPASS NO.,4X,6H DATE ,5X,9HDAY OF YR,6X,
                   2        2HHR,1X,3HMIN,1X,3HSEC)
ISN 0066        2020 FORMAT(1H ,64X,I5,7X,I6,8X,I3,9X,I2,2X,I2,2X,I2)
ISN 0067        2030 FORMAT(1H ,10X,I5,7X,I6,8X,I3,9X,I2,2X,I2,2X,I2,6X,I5,7X,I6,8X,I3,
                   1        9X,I2,2X,I2,2X,I2)
ISN 0068        2040 FORMAT(1H ,10X,I5,7X,I6,8X,I3,9X,I2,2X,I2,2X,I2)
ISN 0069        2050 FORMAT(1H0,10X,45HNORMAL TERMINATION OF SUNLIGHT REPORT OPTION.)
ISN 0070        2060 FORMAT(1H ,10X, 66HHOWEVER,THERE ARE NO SUNLIGHT ENTRANCES/EXITS O
                   1N INPUT GRB3A TAPE.)
ISN 0071          999 RETURN
ISN 0072            END
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS											
I	0016	0017	0019	0025	0026	0027	0035	0038	0039	0040	0048	
IGO	0007	0024	0053	0059								
INT	0025	0052	0059									
DIFF	0027	0028	0030	0040	0041	0043	0043	0044	0046	0046	0047	
IERR	0013											
IFST	0008	0023	0050	0062								
INFR	0028	0029	0052	0059								
INT1	0026	0052	0055									
ICHR	0041	0042	0052	0055								
ICUT	0038	0052	0056									
DIFF1	0029	0030	0032	0033	0042	0043	0045	0046				
DIFF2	0030	0031	0033	0033	0034							
FLOAT	0029	0032	0042	0045								
IEXIT	0009	0037	0062									
INMIN	0031	0032	0052	0059								
INORB	0035	0052	0059									
INSEC	0034	0052	0059									
IOMIN	0044	0045	0052	0056								
IORB	0048	0052	0055									
IOSEC	0047	0052	0056									
ICUT1	0039	0052	0055									
ICOUNT	0011	0049	0049	0056								
JSYOUT	0006	001C	0012	0052	0055	0059	0061	0062				
READIN	0004	0013	0014	0017	0019	0025	0026	0027	0035	0038	0039	0040	0048
RTAPE4	0013											
SUMLGT	0002											
XNINES	0005	0014										

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
8	0010	0056
10	0013	0022 0036 0058
100	0021	0016
200	0023	0017
300	0037	0019
400	0055	0050
502	0056	0054
600	0059	0014
700	0014	
702	0017	
704	0019	
706	0022	
710	0036	
712	0050	
720	0054	
730	0058	
999	0071	
2000	0064	0010
2010	0065	0012
2020	0066	0055
2030	0067	0052
2040	0068	0059
2050	0069	0061
2060	0070	0062

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	SF	I*4	000270	IGO	S	I*4	000274	INT	SF	I*4	000278	DIFF	SF	R*8	0002C0
IERR	SFA	I*4	00027C	IFST	S	I*4	000280	INHR	SFA	I*4	000284	INT1	SF	I*4	000288
IOHR	SFA	I*4	000280	IOUT	SF	I*4	000290	DIFF1	SF	R*8	0002C8	DIFF2	SF	R*8	0002D0
IEXIT	S	I*4	000294	INMIN	SFA	I*4	000298	INORB	SF	I*4	00029C	INSEC	SF	I*4	0002A0
IOMIN	SFA	I*4	0002A4	IORB	SF	I*4	0002A8	IGSEC	SF	I*4	0002AC	IOUT1	SF	I*4	0002B0
IBCOM=	F XF	I*4	000000	ICOUNT	SF	I*4	000284	JSYOUT	F	I*4	000288	READIN	SFA	R*8	0002E8
RTAPE4	SF XF	R*8	000000	SUNLGT		R*8	000208	XNINES		R*8	0002E0				

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   LABEL     ADDR        LABEL     ADDR        LABEL     ADDR        LABEL     ADDR

     8       00CB58        10      000B88       700      000B96 NR     702      000BAC
    7C4      00CBC2       100      000BD8       706      000BEE       200      000BF4
    710      00CD7C NR    300      000D82       712      000F12 NR     720      000F9C NR
    400      00CFA2       502      000FE8       730      000FF6       600      000FFC
    999      001050

*OPTIONS IN EFFECT*      NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,

*OPTIONS IN EFFECT*      SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

*STATISTICS*      SOURCE STATEMENTS =      71,PROGRAM SIZE =     4278

*STATISTICS*   NO DIAGNOSTICS GENERATED

******  END OF COMPILATION  ******                                  113K BYTES OF CORE NOT USED
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LEVEL 19 ( JUNE 70 )                    OS/360  FORTRAN H

        COMPILER OPTIONS - NAME= MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                           SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,IC,XREF
ISN 0002                SUBROUTINE CHKREC
                C     PURPOSE
                C       SUBROUTINE CHKREC IS USED TO CHECK BINARY ORB3A TAPES WHICH HAD
                C       AN ABNORMAL RUN TERMINATION WHEN BEING GENERATED.CERTAIN WORDS
                C       IN EACH RECORD OF THIS TYPE OF ORB3A TAPE ARE CHECKED FOR DATA
                C       ERRORS AND EACH RECORD IS CHECKED FOR A READ ERROR.THE FIRST
                C       INPUT ORB3A RECORD TO FAIL ANY ONE OF THESE CHECKS CAUSES AN
                C       OUTPUT BINARY ORB3A TAPE TO BE GENERATED WITH THE PERIOD OF DATA
                C       EXTENDING THROUGH THE NEXT TO THE LAST RECORD BEFORE THE
                C       CHECK-FAIL RECORD.THE OUTPUT TAPE HAS A REVISED TITLE RECORD
                C       CONTAINING THE NEW END TIME OF THE SATELLITE DATA.
                C     CALLING SEQUENCE
                C       CALL CHKREC
                C       THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
                C     INPUT(THROUGH COMMON)
                C       TITLE = A 256-WORD ARRAY CONTAINING AN ORB3A TITLE RECORD.
                C     OUTPUT(THROUGH COMMON)
                C       NONE.
                C     MAJOR VARIABLES(IN ADDITION TO ABOVE)
                C       IDISK       = FORTRAN LOGICAL UNIT NO. FOR DISK(14).
                C       IERR        = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS
                C                     ENCOUNTERED IN READING AN INPUT ORB3A RECORD.
                C                     =0,NO UNUSUAL CONDITIONS.
                C                     =1,END-OF-FILE.
                C                     =4,PERMANENT READ ERROR,DATA RETURNED BUT ITS
                C                        VALIDITY IS QUESTIONABLE.
                C       IWORD       = FLAG USED IN WSNEOF(ENTRY POINT TO SUBROUTINE
                C                     RWTAP4) PROCESSING FOR BRANCHING,
                C                     SET BY CALLING ROUTINE.
                C                     =1,WSNEOF WRITES ONE SENTINEL ITEM RECORD,TWO
                C                        SENTINEL RECORDS,AND AN END-OF-FILE ON OUTPUT
                C                        ORB3A TAPE.
                C                     =2,WSNEOF WRITES TWO SENTINEL RECORDS AND AN
                C                        END-OF-FILE ON OUTPUT ORB3A TAPE.
                C       JSYSOUT     = FORTRAN LOGICAL UNIT NO. FOR SYSTEM PRINTER(6).
                C       READIN      = A 256-WORD ARRAY CONTAINING AN ORB3A DATA RECORD
                C                     (OR SENTINEL ITEM RECORD AT END OF CHKREC).
                C       READIN(1)   = DATA ITEM TYPE INDICATOR OF 1ST SATELLITE DATA
                C                     ITEM IN ORB3A RECORD.SHOULD HAVE 1 OF THE
                C                     FOLLOWING VALUES
                C                     =1,REGULAR SATELLITE DATA ITEM.
                C                     =2,ASCENDING NODE CROSSING DATA ITEM.
                C                     =3,NORTH POINT DATA ITEM.
                C                     =4,DESCENDING NODE DATA ITEM.
                C                     =5,SOUTH POINT DATA ITEM.
                C                     =6,SUNLIGHT ENTRANCE DATA ITEM.
                C                     =7,SUNLIGHT EXIT DATA ITEM.
                C       READIN(3)   = DAY OF YEAR OF 1ST SATELLITE DATA ITEM IN ORB3A
                C                     RECORD.
                C       READIN(4)   = SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN ORB3A
                C                     RECORD.
                C       READIN(212) = YEAR-MONTH-DAY OF LAST SATELLITE DATA ITEM IN
                C                     ORB3A RECORD.
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C        READIN(213) = DAY OF YEAR OF LAST SATELLITE DATA ITEM IN ORB3A
C                      RECORD.
C        READIN(214) = SECONDS OF DAY OF LAST SATELLITE DATA ITEM IN
C                      ORB3A RECORD.
C        READIN(232) = 1ST WORD OF SPECIAL DATA ITEM IN ORB3A RECORD
C                      WHICH IS THE TYPE INDICATOR FOR THIS SPECIAL DATA
C                      ITEM.SHOULD HAVE THE VALUE OF 99.
C        READIN(234) = 3RD WORD OF SPECIAL DATA ITEM IN ORB3A RECORD
C                      WHICH INDICATES WHETHER OR NOT AN ASCENDING NODE
C                      CROSSING DATA ITEM EXISTS IN THE RECORD.SHOULD
C                      HAVE THE VALUE OF 999. OR BE EQUAL TO A VALUE
C                      BETWEEN 0 AND 100 PERCENT INCLUSIVE.
C        TITLE(5)    = SATELLITE DATA START TIME DAY OF YEAR.
C        TITLE(7)    = SATELLITE DATA END TIME YEAR-MONTH-DAY.
C        TITLE(8)    = SATELLITE DATA END TIME DAY OF YEAR.
C        TITLE(9)    = SATELLITE DATA END TIME SECONDS OF DAY.
C        XDATE       = LOCATION FOR KEEPING A RUNNING COUNT OF DAY OF
C                      YEAR OF 1ST SATELLITE DATA ITEM IN ORB3A RECORDS.
C    REFERENCE
C      IBM FEDERAL SYSTEMS DIVISION,GAITHERSBURG,MARYLAND,''ORBITAL
C      DETERMINATION UTILITY PROGRAMS,''CONTRACT NAS 5-10022,MARCH 1970
C      (TELOR3 PROGRAM SECTION)
C    METHOD
C      BACKSPACING AND/OR REWINDING A 7-TRACK BINARY INPUT ORB3A TAPE
C      IS NOT ALLOWED WHEN USING THE SPECIAL PURPOSE FORTRAN LIBRARY
C      SUBROUTINE,DBFOR,WHICH IS REQUIRED FOR READING THIS INPUT TAPE
C      (SEE SUBROUTINE RWTAP4).SINCE THE CAPABILITY IS DESIRED IN
C      CHKREC FOR BACKSPACING AND/OR REWINDING THE INFORMATION
C      CONTAINED IN THE DATA RECORDS ON AN INPUT ORB3A TAPE,CHKREC
C      COPIES ONTO A DISK THE INPUT ORB3A DATA RECORDS(INCLUDING ANY
C      HAVING READ ERRORS) UP TO THE END-OF-FILE.AN EOF IS WRITTEN ON
C      THE DISK.THE DISK IS REWOUND,AND CHKREC ENTERS A LOOP WHICH DOES
C      THE FOLLOWING
C
C        1.READS A RECORD FROM THE DISK INTO THE READIN ARRAY AND TESTS
C          FOR A READ ERROR,AN END-OF-FILE,AND PROPER DATA IN 5 KEY
C          WORDS IN READIN.
C        2.IF ALL OF THE TESTS ARE PASSED,CHKREC RETURNS TO THE
C          BEGINNING OF THE LOOP AND ANOTHER RECORD IS READ FROM THE
C          DISK INTO THE READIN ARRAY.
C        3.IF ANY 1 OF THE TESTS IS FAILED,AN APPROPRIATE ERROR MESSAGE
C          IS PRINTED,A LOOP EXIT OCCURS,AND THE FOLLOWING STEPS ARE
C          PERFORMED
C            A.THE NEXT TO THE LAST RECORD BEFORE THE CHECK-FAIL RECORD
C              IS READ FROM THE DISK INTO READIN.
C            B.THE TIME OF OCCURRENCE OF THE LAST SATELLITE DATA ITEM
C              IN READIN IS STORED IN THE SATELLITE DATA END TIME
C              POSITIONS IN THE TITLE ARRAY.
C            C.THE TITLE ARRAY NOW CORRESPONDS TO A REVISED TITLE
C              RECORD CONTAINING THE NEW END TIME OF THE SATELLITE DATA
C              AND IS WRITTEN AS THE TITLE RECORD OF THE OUTPUT ORB3A
C              TAPE.
C            D.THE DISK IS REWOUND AND A READ AND COPY OPERATION(FROM
C              DISK TO OUTPUT ORB3A) IS EXECUTED UNTIL THE TIME OF
C              OCCURRENCE OF THE LAST SATELLITE DATA ITEM IN A RECORD
C              COPIED ONTO THE OUTPUT ORB3A MATCHES THE SATELLITE DATA
```

```
C                END-TIME CONTAINED IN THE OUTPUT OR83A TITLE RECORD.
C              E.WSNEOF IS CALLED(ENTRY POINT TO SUBROUTINE RWTAP4) TO
C                WRITE 1-SENTINEL ITEM-RECORD,2-SENTINEL RECORDS,AND AN
C                END-OF-FILE ON THE OUTPUT OR83A TAPE.
C              F.CONTROL IS RETURNED TO CHKREC AND A MESSAGE IS PRINTED
C                OUT STATING A NORMAL TERMINATION OF THE CHECK RECORD
C                OPTION HAS OCCURRED.
C
C     REQUIRED SUBPROGRAMS
C       SUBROUTINE SUBPROGRAMS
C         RTAPE4,WSNEOF,WTAPE4(ALL 3 ARE ENTRY POINTS TO RWTAP4).
C       FUNCTION SUBPROGRAMS
C         NO FUNCTIONS ARE CALLED BY CHKREC.
C     LANGUAGE AND SYSTEM
C       CHKREC HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C       LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C     PROGRAMMER
C       ROBERT K.SCHLESSINGER
C       COMPUTER SCIENCES CORPORATION
C       SILVER SPRING,MARYLAND
C     PREPARED FOR
C       GODDARD SPACE FLIGHT CENTER
C       NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
C       GREENBELT,MARYLAND
C     CONTRACT NUMBER AND COMPLETION DATE
C       NAS 5-11790,TASK 72,SUBTASK H
C       COMPLETED ON 7 MAY 1971
C
C ***START PROGRAM**********************************************************
C
ISN 0003          IMPLICIT REAL*8 (A-H,O-U,W-Z)
ISN 0004          COMMON          TITLE(256),READIN(256)          ,PERIOD    ,ISAVE(6) ,
                 1                ISET
ISN 0005          DATA            IDISK      ,JSYOUT / 14, 6 /
C     TO FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GO TO* AND *CALL*
C     STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
C     STATEMENT LABELS FROM 700-899 INCLUSIVE.
C     THE *RETURN* STATEMENT(NOT REFERENCED INITIALLY.) HAS BEEN ASSIGNED
C     THE LABEL 999.
C
C     STORE SATELLITE DATA START TIME DAY OF YEAR IN LOCATION FOR
C     KEEPING A RUNNING COUNT OF DAY OF YEAR OF 1ST SATELLITE DATA ITEM
C     IN OR83A RECORDS.
ISN 0006          XDATE=TITLE(5)
C     INPUT OR83A TITLE RECORD HAS BEEN PLACED IN TITLE ARRAY BY MAIN.
C
C     BEGIN COPYING OR83A DATA RECORDS FROM INPUT TAPE TO SCRATCH DISK.
ISN 0007        5 CALL RTAPE4(READIN,IERR)
C     IF END-OF-FILE(ECF) HAS BEEN READ,STOP COPYING(GO TO 6).
ISN 0008        7C0 IF(IERR.EQ.1) GO TO 6
ISN 0010          WRITE(IDISK) READIN
ISN 0011        7C2 GO TO 5
C     END COPYING FROM INPUT TAPE TO DISK.
ISN 0012        6 CONTINUE
ISN 0013          END FILE IDISK
ISN 0014          REWIND IDISK
```

```
                C     READ AN ORB3A DATA RECORD FROM DISK INTO READIN ARRAY.
ISN 0015          1 READ(IDISK,ERR=530,END=540) READIN
                C     IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD HAS BECOME 1 GREATER
                C     THAN RUNNING COUNT DAY OF YR,INCREMENT RUNNING COUNT BY 1 .
ISN 0016        C     IF((READIN(3) .EQ. 1.D0) XDATE=XDATE+1.
                C     IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD EQUALS 1ST DAY OF NEW
                C     YR AND RUNNING COUNT EQUALS 365 OR 366,SET RUNNING COUNT TO 1 .
ISN 0018        C     IF(READIN(3) .EQ. 1.D0 .AND. XDATE .EQ. 365.D0  .OR. READIN(3)
                1  .EQ. 1.D0 .AND. XDATE .EQ. 366.D0) XDATE=1.
                C     IF DAY OF YR OF 1ST DATA ITEM IN THIS RECORD EQUALS RUNNING COUNT,
                C     DAY OF YR OF 1ST ITEM HAS NOT INCREASED MORE THAN 1 OVER PREVIOUS
                C     VALUE AND CHECK NO.1 HAS BEEN PASSED(GO TO 20).
ISN 0020          704 IF (READIN(3).EQ.XDATE) GO TO 20
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0022        C     WRITE(JSYOUT,2000)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0023          710 GO TO 555
                C     IF SECONDS OF DAY OF 1ST SATELLITE DATA ITEM IN THIS RECORD ARE LT
                C     86400 AND GE ZERO,CHECK NO.2 HAS BEEN PASSED(GO TO 21).
ISN 0024           20 IF(READIN(4) .LT. 86400.D0 .AND. READIN(4) .GE. 0.D0) GO TO 21
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0026           WRITE(JSYOUT,2010)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0027          720 GO TO 555
                C     IF 3RD WORD OF SPECIAL DATA ITEM IN THIS RECORD EQUALS 999 OR HAS
                C     A VALUE LE 100 PERCENT,CHECK NO.3A HAS BEEN PASSED(GO TO 22).
ISN 0028           21 IF(READIN(234) .EQ. 999.D0 .OR. READIN(234) .LE. 100.D0) GO TO 22
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0030        C     WRITE(JSYOUT,2020)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0031          730 GO TO 555
                C     IF 3RD WORD OF SPECIAL DATA ITEM IN THIS RECORD GE ZERO,THIS 3RD
                C     WORD MUST BE EQUAL TO 999 OR HAVE A VALUE BETWEEN ZERO AND 100
                C     PERCENT INCLUSIVE AND,THEREFORE,CHECK NO.3B HAS BEEN PASSED
                C     (GO TO 23).
ISN 0032           22 IF(READIN(234) .GE. 0.D0) GO TO 23
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0034           WRITE(JSYOUT,2020)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0035          740 GO TO 555
                C     IF TYPE INDICATOR OF 1ST SATELLITE DATA ITEM IN THIS RECORD HAS A
                C     VALUE BETWEEN 1 AND 7 INCLUSIVE,CHECK NO.4 HAS BEEN PASSED
                C     (GO TO 24).
ISN 0036           23 IF(READIN(1) .LE. 7.D0 .AND. READIN(1) .GT. 0.D0) GO TO 24
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0038           WRITE(JSYOUT,2030)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0039          750 GO TO 555
                C     IF 1ST WORD OF SPECIAL DATA ITEM IN THIS RECORD EQUALS 99,CHECK
                C     NO.5 HAS BEEN PASSED AND NEXT INPUT ORB3A DATA RECORD SHOULD BE
                C     EXAMINED(GO TO 1).
ISN 0040           24 IF(READIN(232) .EQ. 99.D0) GO TO 1
                C     PRINT APPROPRIATE CHECK-FAIL MESSAGE.
ISN 0042           WRITE(JSYOUT,2040)
                C     PRINT OUT INPUT ORB3A DATA RECORD WHICH FAILED A CHECK.
ISN 0043          760 GO TO 555
```

```
                C       IF HERE,A READ ERROR HAS OCCURRED.
  ISN 0044        530 WRITE(JSYOUT,2050)
                C       POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE READ
                C     ERROR RECORD.
  ISN 0045        770 GO TO 565
                C       IF HERE,AN END-OF-FILE HAS BEEN READ ON DISK.
  ISN 0046        540 WRITE(JSYOUT,2060)
                C       POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE EOF.
  ISN 0047        780 GO TO 560
                C       INPUT ORB3A DATA RECORD WHICH FAILED A CHECK IS NOW PRINTED.
  ISN 0048        555 WRITE(JSYOUT,2070)
  ISN 0049            DO 400 K=1,247,6
  ISN 0050            M=K+5
  ISN 0051            WRITE(JSYOUT,2080) (READIN(I),I=K,M)
  ISN 0052        400 CONTINUE
                C       POSITION DISK TO BEGINNING OF NEXT TO LAST RECORD BEFORE THE
                C       CHECK-FAIL RECORD.
  ISN 0053        560 BACKSPACE IDISK
  ISN 0054        565 BACKSPACE IDISK
  ISN 0055            BACKSPACE IDISK
                C       READ LAST GOOD INPUT ORB3A DATA RECORD INTO READIN(NEXT TO LAST
                C       RECORD BEFORE CHECK-FAIL RECORD).
  ISN 0056            READ(IDISK) READIN
                C       STORE END TIME OF LAST GOOD ORB3A RECORD IN TITLE ARRAY.
  ISN 0057            TITLE(7)=READIN(212)
  ISN 0058            TITLE(8)=READIN(213)
  ISN 0059            TITLE( 9)=READIN(214)
                C       WRITE OUTPUT ORB3A TITLE RECORD WHICH NOW CONTAINS NEW END TIME
                C       OF SATELLITE DATA.
  ISN 0060        790 CALL WTAPE4(TITLE)
  ISN 0061            REWIND IDISK
                C       READ AN ORB3A DATA RECORD FROM DISK.
  ISN 0062        10  READ(IDISK) READIN
                C       COPY THIS DATA RECORD ONTO OUTPUT ORB3A TAPE.
  ISN 0063        800 CALL WTAPE4(READIN)
                C       IF END TIME OF THIS DATA RECORD EQUALS  DATA END TIME IN OUTPUT
                C       ORB3A TITLE RECORD,NO MORE INPUT ORB3A RECORDS ARE TO BE COPIED
                C       ONTO OUTPUT ORB3A TAPE(GO TO 100)
  ISN 0064        802 IF(READIN(212).EQ.TITLE(7).AND.READIN(213).EQ.TITLE(8).AND.READIN(
                    1214).EQ.TITLE( 9)) GO TO 100
                C       LAST GOOD INPUT ORB3A RECORD HAS NOT BEEN COPIED ONTO OUTPUT ORB3A
                C       TAPE.READ ANOTHER ORB3A DATA RECORD FROM DISK.
  ISN 0066        810 GO TO 10
                C       LAST GOOD INPUT ORB3A DATA RECORD HAS BEEN COPIED ONTO OUTPUT
                C       ORB3A TAPE.NOW PRINT THIS RECORD OUT.
  ISN 0067        100 WRITE(JSYOUT,2090)
  ISN 0068            DO 150 K=1,247,6
  ISN 0069            M=K+5
  ISN 0070            WRITE(JSYOUT,2080) (READIN(I),I=K,M)
  ISN 0071        150 CONTINUE
                C       PRINT OUTPUT ORB3A TAPE TITLE RECORD.
  ISN 0072            WRITE(JSYOUT,2100)
  ISN 0073            DO 500 K=1,247,6
  ISN 0074            M=K+5
  ISN 0075            WRITE(JSYOUT,2080) (TITLE(I),I=K,M)
  ISN 0076        500 CONTINUE
```

```
C     CREATE SENTINEL ITEM RECORD.
      DO 200 I=1,21
      READIN(I)=99999999.00
  200 CONTINUE
C     CREATE SENTINEL RECORD.
      TITLE(1)=99999999.00
C     SET IWORD=1 SO THAT WSNEOF(ENTRY POINT TO SUBROUTINE RWTAP4) WILL
C     WRITE 1 SENTINEL ITEM RECORD,2 SENTINEL RECORDS,AND AN EOF
C     ON OUTPUT ORB3A TAPE.
      IWORD=1
C     CALL WSNEOF TO WRITE THESE RECORDS.
  820 CALL WSNEOF(READIN,TITLE,IWORD)
C     PRINT NORMAL TERMINATION MESSAGE.
      WRITE(JSYOUT,2110)
 2000 FORMAT(1H0,20X,69HDAY OF YEAR OF 1ST DATA ITEM IN A RECORD DOES N
     1OT HAVE A LEGAL VALUE./
     2      1H ,20X, 66HDAY OF YEAR OF THIS DATA ITEM SHOULD NOT INCREA
     3SE MORE THAN 1 OVER/
     4      1H ,20X, 50H1ST DATA ITEM DAY OF YEAR IN LAST PREVIOUS RECO
     5RD.)
 2010 FORMAT(1H0,20X, 72HSECONDS OF DAY OF 1ST DATA ITEM IN A RECORD ARE
     1 NOT WITHIN LEGAL LIMITS./
     2      1H ,20X, 68HSECONDS SHOULD BE LESS THAN 86400 AND GREATER T
     3HAN OR EQUAL TO ZERO.)
 2020 FORMAT(1H0,20X, 70H3RD WORD OF SPECIAL DATA ITEM IN A RECORD DOES
     1NOT HAVE A LEGAL VALUE./
     2      1H ,20X, 79H3RD WORD SHOULD EQUAL 999. OR HAVE A VALUE BETW
     3EEN 0 AND 100 PERCENT INCLUSIVE.)
 2030 FORMAT(1H0,20X, 71HTYPE INDICATOR OF 1ST DATA ITEM IN A RECORD IS
     1NOT WITHIN LEGAL LIMITS./
     2      1H ,20X, 61HTYPE INDICATOR SHOULD HAVE A VALUE BETWEEN 1 AN
     3D 7 INCLUSIVE.)
 2040 FORMAT(1H0,20X, 70H1ST WORD OF SPECIAL DATA ITEM IN A RECORD DOES
     1NOT HAVE A LEGAL VALUE./
     2      1H ,20X, 25H1ST WORD SHOULD EQUAL 99.)
 2050 FORMAT(1H0,20X, 46HA READ ERROR HAS OCCURRED ON INPUT ORB3A TAPE.)
 2060 FORMAT(1H0,20X, 78HSENTINEL TYPE RECORDS ARE MISSING ON INPUT ORB3
     1A TAPE.END-OF-FILE ENCOUNTERED.)
 2070 FORMAT(1H1,38X, 34HINPUT ORB3A CHECK FAIL DATA RECORD)
 2080 FORMAT(1H ,10X,6D15.8)
 2090 FORMAT(1H1,32X, 45HLAST DATA RECORD WRITTEN ON OUTPUT ORB3A TAPE)
 2100 FORMAT(1H1,40X, 30HOUTPUT ORB3A TAPE TITLE RECORD)
 2110 FORMAT(1H0,11X, 42HNORMAL TERMINATION OF CHECK RECORD OPTION.)
  999 RETURN
      END
```

SYMBOL	INTERNAL STATEMENT NUMBERS										
I	0051	0051	0051	0070	0070	0070	0075	0075	0075	0077	0078
K	0049	0056	0061	0068	0069	0070	0073	0074	0075		
M	0050	0051	0069	0070	0074	0075					
IERR	0007	0008									
ISET	0004										
ID-ISK	0005	0016	0013	0014	0015	0053	0054	0055	0056	0061	0062
ISAVE	0004										
IWORD	0061	0062									
TITLE	0004	0006	0057	0058	0059	0060	0064	0064	0064	0075	0080
XDATE	0006	0016	0016	0016	0018	0018	0018	0020			
CHKREC	0002										
JSYOUT	0005	0022	0026	0030	0034	0038	0042	0044	0046	0048	0051
PERIOD	0004										
READIN	0004	0007	0010	0015	0016	0018	0018	0020	0024	0024	0028
	0058	0059	0062	0063	0064	0064	0064	0070	0078	0082	
RTAPE4	0007										
WSNEOF	0082										
WTAPE4	0060	0063									

*****FORTRAN CROSS REFERENCE LISTING*****

LABEL	DEFINED	REFERENCES
1	0015	0040
5	0007	0011
6	0012	0008
10	0062	0066
20	0024	0020
21	0028	0024
22	0032	0028
23	0036	0032
24	0040	0036
100	0067	0064
150	0071	0068
200	0079	0077
400	0052	0049
500	0076	0073
530	0044	0015
540	0046	0015
555	0048	0023 0027 0031 0035 0039 0043
560	0053	0047
565	0054	0045
700	0008	
702	0011	
704	0020	
710	0023	
720	0027	
730	0031	
740	0035	
750	0039	
760	0043	
770	0045	
780	0047	
790	0060	
800	0062	
802	0064	
810	0066	
820	0082	
999	0096	
2000	0084	0022
2010	0085	0026
2020	0086	0030 0034
2030	0087	0038
2040	0088	0042
2050	0089	0044
2060	0090	0046
2070	0091	0048
2080	0092	0051 0070 0075
2090	0093	0067
2100	0094	0072
2110	0095	0083

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	SF	I*4	000590	K	SF	I*4	000594	M	SF	I*4	000598	IERR	SFA	I*4	00059C
ISET	C	I*4	N.R.	IDISK	F	I*4	0005A0	ISAVE	C	I*4	N.R.	IWORD	SFA	I*4	0005A4
TITLE	SFA	R*8	000000	XDATE	SF	R*8	0005B0	CHKREC		R*8	000588	IBCOM=	F	XF	I*4	000000
JSYOLT	F	I*4	0005A8	PERIOD	C	R*8	N.R.	READIN	SFA	C	R*8	000800	RTAPE4	SF	XF	R*8	000000
NSNEOF	SF	XF	R*8	000000	NTAPE4	SF	XF	R*8	000000								

***** COMMON INFORMATION *****

NAME OF COMMON BLOCK * * SIZE OF BLOCK 001024 HEXADECIMAL BYTES

VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.	VAR. NAME	TYPE	REL. ADDR.
TITLE	R*8	000000	READIN	R*8	000800	PERIOD	R*8	N.R.	ISAVE	I*4	N.R.
ISET	I*4	N.R.									

```
   LABEL     ADDR                LABEL     ADDR                LABEL     ADDR                LABEL     ADDR

     5     000660               700     0006CE NR            702     0006F8 NR              6     0006FE
     1     000718               704     0007DC               710     000804 NR             20     00080A
   720     000840 NR             21     000846               730     000880 NR             22     000886
   740     0008AC NR             23     000882               750     0008E8 NR             24     0008EE
   760     000914 NR            530     00091A               770     000930 NR            540     000936
   780     00094C NR            555     000952               400     0009C2               560     0009D8
   565     0009E4               790     000A34 NR             10     000A50               800     000A6C NR
   802     000A7A NR            810     000AC8               100     000ACE               150     000B3E
   500     000BC2               200     000BF4               820     000C1E NR            999     000C40 NR

 *OPT-ICNS-IN-EFFECT*      NAME=  MAIN,OPT=00,LINECNT=58,SIZE=0000K,

 *OPT-IGNS-IN-EFFECT*      SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

 *STA-T-IST-ICS*      SOURCE STATEMENTS =     96 ,PROGRAM SIZE =     3174

 *STA-T-IST-ICS*   NO   DIAGNOSTICS GENERATED

 ******  END OF COMPILATION  ******                                    105K BYTES OF CORE NOT USED
```

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-LEVEL 19 (JUNE 70)                    OS/360  FORTRAN H                    DATE 71.158/11.44.07

      COMPILER OPTIONS - NAME=MAIN,OPT=00,LINECNT=58,SIZE=0000K,
                         SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
ISN 0002            SUBROUTINE RWTAP4
C       PURPOSE
C         SUBROUTINE RWTAP4 IS USED TO READ A 7-TRACK BINARY CRB3A SINGLE
C         PRECISION FLOATING POINT TAPE WHICH IS THE INPUT TO THE S/360
C         T&LCP3 PROGRAM.  IN ADDITION, RWTAP4 IS CALLED TO CREATE AN OUTPUT
C         CRB3A TAPE IN THE SAME FORMAT AS THE INPUT CRB3A TAPE.
C       CALLING SEQUENCE(STANDARD ENTRY POINT)
C         CALL RWTAP4
C         THERE ARE NO ARGUMENTS IN THE CALLING SEQUENCE.
C       CALLING SEQUENCE(NON-STANDARD ENTRY POINT NO.1)
C         CALL RTAPE4(RECORD,IERR)
C       INPUT
C         NONE.
C       OUTPUT
C         RECORD = A 256-WORD ARRAY USED TO STORE A RECORD READ FROM THE
C                  INPUT CRB3A TAPE.
C         IERR   = ERROR INDICATOR REFLECTING UNUSUAL CONDITIONS
C                  ENCOUNTERED IN READING AN INPUT CRB3A RECORD.
C                  =0,NO UNUSUAL CONDITIONS.
C                  =1,END-OF-FILE.
C                  =4,PERMANENT READ ERROR,DATA RETURNED BUT ITS
C                     VALIDITY IS QUESTIONABLE.
C       CALLING SEQUENCE(NON-STANDARD ENTRY POINT NO.2)
C         CALL WTAPE4(RECORD)
C       INPUT
C         RECORD = A 256-WORD ARRAY USED TO STORE A TITLE RECORD OR A DATA
C                  RECORD READY TO BE WRITTEN ON THE OUTPUT CRB3A TAPE.
C       OUTPUT
C         NONE.
C       CALLING SEQUENCE(NON-STANDARD ENTRY POINT NO.3)
C         CALL WSNEOF(RECORD,RECRD1,IWORD)
C       INPUT
C         RECORD = A 256-WORD ARRAY USED TO STORE A SENTINEL ITEM RECORD
C                  READY TO BE WRITTEN ON THE OUTPUT CRB3A TAPE.
C         RECRD1 = A 256-WORD ARRAY USED TO STORE A SENTINEL RECORD READY
C                  TO BE WRITTEN ON THE OUTPUT CRB3A TAPE.
C         IWORD  = FLAG FOR BRANCHING.
C                  =1,WSNEOF WRITES 1 SENTINEL ITEM RECORD, 2 SENTINEL
C                  RECORDS, AND AN END-OF-FILE ON THE OUTPUT CRB3A TAPE.
C                  =2,WSNEOF WRITES 2 SENTINEL RECORDS AND AN END-OF-FILE
C                  ON THE OUTPUT CRB3A TAPE.
C       OUTPUT
C         NONE.
C
C
C       INPUT(THROUGH COMMON)
C         NONE.
C       OUTPUT(THROUGH COMMON)
C         NONE.
C       MAJOR VARIABLES(IN ADDITION TO ABOVE)
C         JOUTBN = FORTRAN LOGICAL UNIT NO. FOR OUTPUT CRB3A TAPE(15).
C       REFERENCES
C         WOLF RESEARCH AND DEVELOPMENT CORPORATION, RIVERDALE, MARYLAND.
```

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C     **SPACE AND EARTH SCIENCES COMPUTING CENTER USER'S GUIDE,**
C     CONTRACT NAS 5-11735,MOD 3,REVISED 1 MAY 1970
C     (**DEBLOCK/CNVRT PACKAGE,**SECTION II,PAGES 225,226)
C
C     COMPUTER PROGRAM LIBRARY,GODDARD SPACE FLIGHT CENTER,BLDG. 16A,
C     ROOM 25,GREENBELT,MARYLAND.REGISTERED COMPUTER PROGRAM
C     NUMBER A00042-DATCON.
C   METHOD
C     FOR EACH RECORD TO BE READ FROM THE 7-TRACK BINARY INPUT ORB3A
C     TAPE CONTAINING SINGLE PRECISION FLOATING POINT DATA,IT IS
C     NECESSARY TO MAKE A CALL TO ENTRY POINT RTAPE4 OF SUBROUTINE
C     RWTAP4.AFTER ENTERING AT RTAPE4 THE FOLLOWING STEPS ARE EXECUTED
C
C       1.A CALL IS MADE TO THE SPECIAL PURPOSE FORTRAN LIBRARY
C         SUBROUTINE CBFOR(SEE 1ST REFERENCE ABOVE).DBFOR ALLOWS A
C         7-TRACK FORTRAN TAPE TO BE READ ON A S/360 SERIES COMPUTER
C         AND PROVIDES ONE LOGICAL RECORD IN PROPER FORMAT FOR
C         PROCESSING ACCORDING TO STEP 2 BELOW.
C       2.A CALL IS MADE TO THE SPECIAL PURPOSE FORTRAN LIBRARY
C         SUBROUTINE CNVRT(SEE 1ST REFERENCE ABOVE) IMMEDIATELY AFTER
C         THE CALL TO DBFOR.THE CNVRT SUBROUTINE CONVERTS THE SINGLE
C         PRECISION 7094 FLOATING POINT DATA IN THE LOGICAL RECORD
C         PROVIDED BY DBFOR TO DOUBLE WORD S/360 FLOATING POINT
C         STRUCTURED DATA AND PLACES THE RESULTS IN THE 256-WORD ARRAY
C         NAMED RECORD.
C
C     FOR EACH RECORD TO BE WRITTEN ON THE 7-TRACK BINARY OUTPUT ORB3A
C     TAPE CONTAINING SINGLE PRECISION FLOATING POINT DATA,IT IS
C     NECESSARY TO MAKE A CALL TO ENTRY POINT WTAPE4 OF SUBROUTINE
C     RWTAP4.AFTER ENTERING AT WTAPE4 THE FOLLOWING STEPS ARE EXECUTED
C
C       1.A CALL IS MADE TO DATCON(SEE 2ND REFERENCE ABOVE) WHICH
C         CONSISTS OF AN EXISTING SET OF S/360 ASSEMBLER LANGUAGE
C         SUBROUTINES MODIFIED FOR TELOR3 PROGRAM PURPOSES TO OMIT THE
C         COMPLEMENTING OF NEGATIVE NUMBERS WHEN PERFORMING THE
C         FOLLOWING MANIPULATION.DATCON CONVERTS THE DOUBLE WORD S/360
C         FLOATING POINT DATA IN THE ARRAY RECORD TO SINGLE PRECISION
C         7094 FLOATING POINT DATA.
C       2.A SECOND CALL IS MADE TO DATCON WHICH WRITES THE CONVERTED
C         DATA(SINGLE PRECISION 7094 FLOATING POINT) AS 1 LOGICAL
C         RECORD ON THE 7-TRACK BINARY OUTPUT ORB3A TAPE.
C
C     IN ORDER TO WRITE THE APPROPRIATE NO. OF SENTINEL ITEM AND/OR
C     SENTINEL RECORDS AND AN END-OF-FILE ON THE 7-TRACK OUTPUT ORB3A
C     TAPE,IT IS NECESSARY TO MAKE ONE CALL TO ENTRY POINT WSNEOF OF
C     SUBROUTINE RWTAP4.THE PRINCIPLE OF WRITING THESE SENTINEL TYPE
C     RECORDS IS IDENTICAL TO THAT EMPLOYED IN WTAPE4 ABOVE.
C   REQUIRED  SUBPROGRAMS
C     SUBROUTINE SUBPROGRAMS
C       CNVRT,DATCON,DBFOR
C     FUNCTION SUBPROGRAMS
C       NO FUNCTIONS ARE CALLED BY RWTAP4.
C   LANGUAGE AND SYSTEM
C     RWTAP4 HAS BEEN COMPILED UNDER FORTRAN IV,LEVEL H,OPTIMIZATION
C     LEVEL OF ZERO ON THE IBM 360/95 USING RELEASE 19.
C   PROGRAMMER
```

```
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                C     PREPARED FOR
                C       GODDARD SPACE FLIGHT CENTER
                C       NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
                C       GREENBELT,MARYLAND
                C     CONTRACT NUMBER AND COMPLETION DATE
                C       NAS 5-11790,TASK 72,SUBTASK H
                C       COMPLETED ON 7 MAY 1971
                C
                C *** START PROGRAM ************************************************
                C
  ISN 0003            IMPLICIT REAL*8 (A-H,O-U,W-Z)
  ISN 0004            DIMENSION       RECORD(256)       ,RECRD1(256)
  ISN 0005            DATA            JOUTBN / 15 /
                C     TO FACILITATE THE USE OF DEBUGGING TOOLS,ALL *GO TO* AND *CALL*
                C     STATEMENTS WHICH WERE NOT REFERENCED INITIALLY HAVE BEEN ASSIGNED
                C     STATEMENT LABELS FROM 700-899 INCLUSIVE.
                C
                C     INITIALIZATION CALL WHICH CAUSES THE OUTPUT ORB3A TAPE TO BE
                C     GENERATED BY DATCON TO ACTUALLY HAVE A UNIVAC 1107
                C     TYPE FORMAT.
  ISN 0006        700 CALL DATCON(97)
                C     INITIALIZATION CALL SPECIFYING FORTRAN LOGICAL UNIT NO.(JOUTBN) ON
                C     WHICH OUTPUT ORB3A WILL BE WRITTEN AND SPECIFYING NO. OF 36-BIT
                C     WORDS IN 1 RECORD ON OUTPUT TAPE(253 DATA WORDS,CONTROL WORDS ARE
                C     NOT TO BE COUNTED).
  ISN 0007        710 CALL DATCON(JOUTBN,253)
  ISN 0008        720 GO TO 999
  ISN 0009            ENTRY RTAPE4(RECORD,IERR)
                C     THE FOLLOWING 2 CALLS TAKEN TOGETHER READ 1 RECORD FROM INPUT
                C     ORB3A TAPE AND PLACE RESULTS IN ARRAY RECORD.
  ISN 0010        730 CALL DBFOR(256,IADD,IERR)
  ISN 0011        740 CALL CNVRT(IADD,RECORD,256,2,JERR,1)
  ISN 0012        750 GO TO 999
  ISN 0013            ENTRY WTAPE4(RECORD)
                C     THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 TITLE OR DATA RECORD
                C     ON OUTPUT ORB3A TAPE USING DATA IN ARRAY RECORD.
  ISN 0014        760 CALL DATCON(47,RECORD,253,JOUTBN)
  ISN 0015        770 CALL DATCON(JOUTBN,-1)
  ISN 0016        780 GO TO 999
  ISN 0017            ENTRY WSNEOF(RECORD,RECRD1,IWORD)
                C     IF LAST DATA RECORD TO BE WRITTEN ON OUTPUT ORB3A HAD LESS THAN 11
                C     VALID DATA ITEMS,WRITE 2 SENTINEL RECORDS AND AN END-OF-FILE ON
                C     OUTPUT ORB3A(IWORD=2).OTHERWISE,WRITE 1 SENTINEL ITEM RECORD,2
                C     SENTINEL RECORDS,AND AN END-OF-FILE(IWORD=1).
  ISN 0018        782 IF(IWORD.NE.1) GO TO 10
                C     IF HERE,WRITE 3 SENTINEL TYPE RECORDS AND AN END-OF-FILE ON OUTPUT
                C     ORB3A.
                C
                C     THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL ITEM RECORD
                C     ON OUTPUT ORB3A TAPE USING DATA IN ARRAY RECORD.
  ISN 0020        790 CALL DATCON(47,RECORD,253,JOUTBN)
  ISN 0021        800 CALL DATCON(JOUTBN,-1)
  ISN 0022         10 CONTINUE
```

```
                C     IF HERE,WRITE 2 SENTINEL RECORDS AND AN END OF FILE ON OUTPUT
                C     ORB3A.
                C
                C     THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL RECORD ON
                C     OUTPUT ORB3A TAPE USING DATA IN ARRAY RECRD1.
ISN 0023          810 CALL DATCON(47,RECRD1,253,JOUTBN)
ISN 0024          820 CALL DATCON(JOUTBN,-1)
                C     THE FOLLOWING 2 CALLS TAKEN TOGETHER WRITE 1 SENTINEL RECORD ON
                C     OUTPUT ORB3A TAPE USING DATA IN ARRAY RECRD1.
ISN 0025          830 CALL DATCON(47,RECRD1,253,JOUTBN)
ISN 0026          840 CALL DATCON(JOUTBN,-1)
                C     THE FOLLOWING CALL WRITES AN END-OF-FILE ON OUTPUT ORB3A TAPE.
ISN 0027          850 CALL DATCON(JOUTBN,-2)
                C     REWIND OUTPUT ORB3A TAPE.
ISN 0028              REWIND JOUTBN
ISN 0029          999 RETURN
ISN 0030              END
```

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

SYMBOL	INTERNAL STATEMENT NUMBERS										
IADD	0010	0011									
IERR	0009	0010									
JERR	0011										
CNVRT	0011										
DEFOR	0010										
INCRD	0017	0018									
DATCON	0006	0007	0014	0015	0020	0021	0023	0024	0025	0026	0027
JBUTBN	0005	0007	0014	0015	0020	0021	0023	0024	0025	0026	0027 0028
RECORD	0004	0005	0011	0013	0014	0017	0020				
RECRD1	0004	0017	0023	0025							
RTAPE4	0009										
RWTAP4	0002										
WSNECF	0017										
WTAPE4	0013										

*****F O R T R A N C R O S S R E F E R E N C E L I S T I N G*****

LABEL	DEFINED	REFERENCES
10	0022	0018
700	0006	
710	0007	
720	0008	
730	0010	
740	0011	
750	0012	
760	0014	
770	0015	
780	0016	
782	0018	
790	0020	
800	0021	
810	0023	
820	0024	
830	0025	
840	0026	
850	0027	
999	0029	CCC8 0012 0016

/ RWTAP4 / SIZE OF PROGRAM 00043E HEXADECIMAL BYTES PAGE 007

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
IADD	SFA	I*4	000110	IERR	SFA	I*4	000114	JERR	SFA	I*4	000118	CNVRT	SF XF	R*8	000000
DBFOR	SF XF	R*8	000000	IWORD		I*4	00011C	DATCON	SF XF	R*8	000000	IBCOM=	F. XF	I*4	000000
JOUTBN	SFA	I*4	000120	RECORD	SFA XR	R*8	000000	RECRD1	SFA XR	R*8	000000	RTAPE4		R*8	000128
RWTAP4		R*8	000130	WSNEOF		R*8	000138	WTAPE4		R*8	000140				

```
   LABEL    ADDR                LABEL    ADDR                LABEL    ADDR                LABEL    ADDR

     700    006198                710    0001A6 NR             720    0001B4 NR             730    0001BA
     740    001C8 NR              750    0001D6 NR             760    0001DC                770    0001EA NR
     780    002202 NR             782    000208                790    000216                800    000224 NR
      10    00023C                810    00023C NR             820    00024A NR             830    000262 NR
     840    002270 NR             850    000286 NR             999    0002AC

*OPTIONS IN EFFECT*          NAME=   MAIN,OPT=00,LINECNT=58,SIZE=0000K,

*OPTIONS IN EFFECT*          SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF

*STATISTICS*        SOURCE STATEMENTS =       29 ,PROGRAM SIZE =      1086

*STATISTICS*   NO   DIAGNOSTICS GENERATED

******   END OF COMPILATION   ******                                  113K BYTES OF CORE NOT USED

*STATISTICS*   NO   DIAGNOSTICS THIS STEP
```

```
IEF285I   SYS71156.T103436.RV000.ZBRKS000.OBJMOD        PASSED
IEF285I   VOL SER NOS= G1SCRA.
IEF285I   SYS71156.T103436.RV000.ZBRKS000.R0000433      SYSOUT
IEF285I   VOL SER NOS= G1SCRA.
IEF285I   SYS71156.T103436.RV000.ZBRKS000.R0000434      DELETED
IEF285I   VOL SER NOS= G1SCR8.
IEF285I   SYS71156.T103436.RV000.ZBRKS000.R0000435      DELETED
IEF285I   VOL SER NOS= G1SCRA.
IEF285I   SYS71156.T103436.RV000.ZBRKS000.S0000436      SYSIN
IEF285I   VOL SER NOS= G1SCR1.
IEF285I   SYS71156.T103436.RV000.ZBRKS000.S0000436      DELETED
IEF285I   VOL SER NOS= G1SCR1.
-------JOB NBR---219 STEP NBR---01 ZBRKS000 SOURCE PGM=IEKAA00 CARDS=01805 INITIATION TIME=11.41.27.06 DATE=06-07-71
-----  CPU=000.1 I/O=000.1 CORE=000.1  CHARGE=000.10          STEP-01  SOURCE    TERMINATION TIME=11.44.14.75 DATE=06-07-71
---------I/O TIME BY DEVICE. DISK=*****1.71,DRUM=*****1.95,TAPE=******.00,CELL=******.00,OTHR=******.00
-----  STEP REGION SIZE=0300K  MAXIMUM REGION SIZE USED=0300K   PERCENT OF REGION USED=99
IEF285I   SYS71156.T103436.RV000.ZBRKS000.OBJMOD        DELETED
IEF285I   VOL SER NOS= G1SCRA.

---------CPU=000.1 I/O=000.1 CORE=000.1 CHARGE=000.10 JOB NBR=219 ZBRKS000 360/95 SYSTEM=MVT-19.6 01-16-71 G1
-----  I/O TIME BY DEVICE.  DISK=*****1.71,DRUM=*****1.95,TAPE=******.00,CELL=******.00,OTHR=******.00
```